

Wool Economy in the Ancient Near East

**Wool Economy in the
Ancient Near East
the Aegean (Ancient Textiles,
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WOOL ECONOMY IN THE ANCIENT NEAR EAST AND THE AEGEAN

From the Beginnings of Sheep Husbandry
to Institutional Textile Industry



edited by

Catherine Breniquet and Cécile Michel



ANCIENT TEXTILES SERIES VOL. 17

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AND THE AEGEAN

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Front cover: Sheep arriving at Aššur, drawing by W. Andrae; Sketch of the animal frieze on the ritual limestone basin, Ebla, Temple D.

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Foreword

The present volume gathers together the contributions presented at the European Science Foundation Exploratory Workshop on *Wool Economy in the Ancient Near East and the Aegean: From the Beginnings of Sheep Husbandry to Institutional Textile Industry*, which took place in Nanterre, November 7–10, 2012. The workshop brought together experts from many different countries and various disciplines in order to reconstruct the role played by wool in the economies of ancient Mesopotamia and the Aegean.¹ This conference was another step in a long term joint project started in the 2000s.

In 2008, an initial internal workshop encouraged scholars from the *Maison de l'Archéologie et de l'Ethnologie* (Nanterre, France) to work together to study textiles according to different sources and approaches: archaeology, ethnology, textile studies, etc. The aim of that workshop was to study technical systems, especially those which dealt with textile production.² Then it became clear to us that the thematic project needed to be constructed on a different basis.

Indeed, textile research has developed considerably during the last two decades in large national or international projects; but French research in this domain concerned mainly isolated researchers in various CNRS groups and Universities across France.³ Since 2005, the French team *Histoire et archéologie de l'Orient cunéiforme* (HAROC), which belongs to the CNRS large group *Archéologies et Sciences de l'Antiquité* located in Nanterre, has launched an ongoing collaboration with the *Danish National Research Foundation Centre for Textile Research* (CTR) which is the main European centre working on ancient textiles.

In March 2009, a further workshop brought together international scholars on a restricted topic, dealing with textile terminologies in the Mediterranean and the Near East from the 3rd to the 1st millennia BC. This conference was mainly financed by the European Science Foundation (ESF). This first ESF Exploratory Workshop took place in Copenhagen and reinforced the collaboration between our two centres of research, the CTR and HAROC teams. Written sources offer many references to a complex vocabulary associated with textiles, tools and techniques, and also with textile decoration and the various professions linked to this craft. Even if translations for all these words often remain difficult to propose, the workshop has shown that textile terminology circulated and changed in a complex way according to fashions, to the discovery of new fibres and to the markets. A focus was made on the 3rd and 2nd millennia BC because, during that period, we can observe the growth of textile manufacturers belonging to palaces and temples. Through the analysis of textile terminologies we have underlined contacts, innovations and structures of a pre-monetary economy. During the final discussion of that first joint meeting, plans were already being formulated for a workshop devoted to the wool economy. Half of the contributors to the wool workshop have

already contributed a paper to the first joint meeting in 2009. Efforts were successful to publish the proceedings a year later in the series *Ancient Textiles* (Oxford).⁴

This second ESF Exploratory Workshop was organized within the frame of a new collaborative project between HAROC and the CTR which started in January 2012 and will last for three years. This *Projet International de Cooperation Scientifique* (PICS), entitled *Textiles from the Orient to the Mediterranean (TexOrMed)*, intends to unite historians of texts and images, archaeologists, craftspeople testing techniques and textile tools, palaeobotanists, and palaeozoologists in order to reconstitute the processes which led to the first form of large scale industry in Antiquity. Participants in this research program are members of the CTR in Denmark and, for France, researchers and University professors from several CNRS and University teams in Nanterre, Lyon, and Clermont-Ferrand.⁵

The other main contribution of the PICS *TexOrMed* in 2012 was the joint publication of a special issue of the journal *Paleorient* (vol. 38) dedicated to the Prehistory of Textiles in the Ancient Near East.⁶

Among the many planned projects within the PICS *TexOrMed* is a second international workshop on the theme of *Textile Terminologies from the Orient to the Mediterranean 1000 BC to 1000 AD*. This conference, which will take place in Copenhagen in June 2014, will explore textile terminologies in a range of languages and cultures; presentations will be based on defined areas as well as comparative studies, synchronic and diachronic approaches.

Acknowledgements

The workshop dedicated to *Wool Economy* was built on an interdisciplinary dynamic. All the sessions were moderated by colleagues who have a wide knowledge in each specific field: Petr Charvat and Marie-Louise Nosch for the first day, Nicholas Postgate and Maria Giovanna Biga for the second day, and Benjamin Foster for the Saturday morning. During the final discussion, syntheses were presented for Mesopotamia in the 3rd millennium by Catherine Breniquet, in the 2nd and 1st millennia by Cécile Michel and for the Aegean by Françoise Rougemont.

Eva Andersson Strand and Antoinette Rast-Eicher very kindly prepared an experimental session during which the participants were invited to try to spin wool and to identify various kinds of wool and goat hair.

During the conference, the convenors and all the participants very much appreciated the presence of Bernhard Palme, the ESF representative, Professor für Alte Geschichte und Papyrologie an der Universität Wien, for his advice and participation during the meeting. Two PhD students, Louise Quillien and Robert Middeke-Conlin, very helpfully contributed to the practical organization.



Conference participants. Photo: Robert Middeke-Conlin.

1. *Pietro Militello*
2. *Philippe Abrahami*
3. *Emmanuelle Vila*
4. *Régis Vallet*
5. *Bernhard Palme*
6. *Petr Charvát*
7. *Cecilie Brøns*
8. *Luca Peyronel*
9. *Katrien De Graef*
10. *Juan-Pablo Vita*
11. *Maria Giovanna Biga*
12. *Valérie Matoïan*
13. *Françoise Rougemont*
14. *Marie-Louise Nosch*
15. *Nicholas Postgate*

16. Stefan Zawadzki
17. Walther Sallaberger
18. Benjamin Foster
19. Agnete Wisti Lassen
20. Eva Andersson Strand
21. Cécile Michel
22. Catherine Breniquet
23. Antoinette Rast-Eicher

Absent from photo:

Laurent Colonna D'Istria

Daniel Helmer

Francis Joannès

Romina Laurito

Cristina Lemorini

Assunta Perilli

May all these colleagues be warmly thanked.

The scientific committee for the present book, in addition to the two editors, is composed of Marie-Louise Nosch, director of the *CTR* and of the series *Ancient Textiles* which welcome this book, and Richard Firth, member of the *CTR*, who very kindly and patiently corrected the contributions of all the non-native English authors and made many valuable comments on the scientific content of the articles. We are extremely grateful to them.

The host of the conference was the Université Paris Ouest Nanterre La Défense and for the lunches and organization, the human sciences research institute *Maison Archéologie et Ethnologie*. The workshop received financial help from the programme PICS *TexOrMed* (CNRS and DNRf), from the Université Paris 1 Panthéon-Sorbonne, and from the *Centre d'Histoire Espaces et Cultures* (Clermont-Ferrand). The main sponsor of the workshop and the present volume is the European Science Foundation. We thank all these organizations for their precious support.

July 2013

Catherine Breniquet (Clermont-Ferrand)

Cécile Michel (Nanterre)

¹ A first project on a workshop dedicated to wool was planned by C. Breniquet and J.-L. Huot on November 2001 in Beyrouth under the title 'La laine au Proche-Orient dans l'Antiquité pré-classique'; it was cancelled because of the international situation at that moment.

² This workshop ('Textile', Maison de l'Archéologie et de l'Ethnologie, Nanterre, 16 June 2008), organized by C. Breniquet, was published online and contributions may be downloaded freely at the following link: <http://www.mae.u-paris10.fr/arscan/Journee-d-etude-textiles-Theme-III.html>.

³ No French institution is involved, for example, in the European programme *DressID: Clothing and Identities in the Roman World* (2007–2013), which deals only with the Roman world. The CIÉTA (Centre International d'Études de Textiles Anciens), at Lyon, is dedicated to modern textile production, especially to silk production.

⁴ C. Michel and M.-L. Nosch (eds) 2010. *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First millennia BC*, Oxford (Ancient Textile series, no. 8).

⁵ The PICS *TexOrMed* is coordinated by C. Michel for the French CNRS and University laboratories, and by M.-L. Nosch for the *CTR*; <http://www.mae.u-paris10.fr/arscan/Textiles-de-l-Orient-A-la.html>.

⁶ *Paléorient* 38, 2012: *Préhistoire des textiles dans l'Orient ancien*, C. Breniquet, E. Andersson Strand, M. Tenberg and M.-L. Nosch (eds).

Wool Economy in the Ancient Near East and the Aegean

Catherine Breniquet and Cécile Michel

Old Babylonian texts from the first half of the 2nd millennium BC dealing with trade often suggest that Mesopotamia is the land of wool. For scholars who travelled in this area from the middle of the 19th century, it is easy to understand why. The environment allows people to observe numerous herds of sheep grazing in the steppe or desert areas surrounding the Mesopotamian plain. Civilizations of the ancient Near East are supposed not to change over millennia. But this assumption is too short sighted to explain the whole evolution of the wool economy. However, with the introduction of interdisciplinary studies in archaeology and history, we know that herding practices or uses of wool in Antiquity are synonymous with cultural behaviors which need to be understood on scientific grounds in a dynamic perspective. The same situation can be observed in the Aegean, although the historical frame is shorter.

Till now, despite the fact that textile research in Europe is an interdisciplinary and international discipline, it is paradoxically carried out mainly by scholars in isolation, in universities, museums, and laboratories. During the past decade, new analytic methods have been developed in the area of textile research and the archaeology of sheep husbandry, as exemplified by the 2010 European Science Foundation (ESF) Exploratory Workshop organized by M. Gleba and C. Solazzo, 'Archaeology of Sheep Domestication: New Approaches', which dealt with European historical periods.¹ Therefore, it now appears essential to explore the origins and beginnings of the wool economy in the Mediterranean and the ancient Near East, where, remarkably enough, we lack any knowledge of the stages leading up to large-scale textile manufacture. The data provided by archaeology, archaeozoology, and philology needed to be brought together into a united historical perspective. There was in fact no prior systematic study of the multiple aspects of wool in the economies of the various Near Eastern and Aegean states from the beginnings of writing until the end of the 1st millennium BC. Scholars never before had the opportunity to compare their approaches and their conclusions. One of the main goals of the conference, whose proceedings are published in the present book, was thus to make colleagues aware of the enormous potential of such an interdisciplinary approach, which can revitalize historical research on technology, economy, and the environment in ancient Near Eastern studies.

As the result of the ESF Exploratory Workshop held in November 2012, this publication intends to contribute towards a better understanding of the role of wool and woollen textiles in ancient economies.

1. Chronological, historical and geographical frame

The history of the Ancient Near East covers a huge chronological frame, from the first pictographic texts of the late 4th millennium to the conquest of Alexander the Great in 333 BC. During these millennia, different societies – from the first urban ones to the universal empires of the late first millennium – develop in a changing landscape where sheep (and their wool) always played an important economic role. We choose to explore the place of wool in the economy, paying attention to the construction of the so-called ‘Wool Revolution’.²

Wool was originally used for weaving and probably controlled by the first urban institutions, but, as a novel material, it also became a form of payment, given to workers as such, and exchanged within the framework of a primitive market economy. Wool became a kind of currency in a pre-monetary economy. This ‘wool revolution’ had less impact in the Bronze Age Aegean, where linen kept its importance along with wool, but there too, wool was produced in large quantities, as evidenced by Linear A and B tablets.

If Mesopotamia in the 3rd millennium BC has been called the birthplace of wool, this is because of local socio-economic developments that led to its increased production, as well as improvements in techniques for the manufacture of woollen threads and fabrics. In this region, workshops first began to produce fabrics and clothing in unprecedented quantities. By the late 3rd millennium BC, wool had become the main woven material and was distributed to male and female workers as a subsistence ration. The ESF Exploratory Workshop analyzed the impact of this transformation, which radically altered the natural environment, the political landscape, and international trade networks, across the Near East to the Aegean. Its main focus was economic aspects of wool production.

The first textiles were made from vegetal fibres,³ the most important of them flax, cultivated from the beginnings of agriculture (around 9,000 BC).⁴ Flax textiles remained in use till the end of the 1st millennium BC.⁵ The exploitation of wool began as a consequence of the domestication and selective breeding of livestock. In southern Mesopotamia, with the onset of urbanism in the late 5th and 4th millennia BC, archaeozoological remains suggest that husbandry of pigs and cattle began to lose ground to nomadic goat and sheep-herding. This development should be understood within the context of the economy of Ubaidian chiefdoms, in which sheep became the animal of prestige.⁶ Wool fibres implied new techniques: spinning with the spindle, whorl, and distaff; weaving using the vertical weighted loom; felting. Use of animal fibres brought with it new forms of management, such as quotas of yield and production: our challenge was to describe and document this process.

According to cuneiform documentation, large-scale textile production began during the second half of the 3rd millennium.⁷ Domestic production went on, but only women wove at home; spindles and spindle whorls became a female gender marker among grave goods.⁸ In Mesopotamian institutions and in Aegean palaces, scribes recorded standardized production goals for both palatial wool production and for textile production in workshops. Thousands of textile workers, primarily

women and children, were supervised and sustained by the central authorities.⁹

Early in the 2nd millennium BC, international trade in textiles expanded, its profitability depended on the quality of the fleece from which the textiles were produced.¹⁰ Isotopic analyses allow the possibility of following the growth of some herds;¹¹ diversification of wool-bearing sheep breeds can also be detected. In southern Mesopotamia, palaces employed merchants to market the wool produced by their herds; private entrepreneurs also engaged in such commerce.¹²

During the 1st millennium, wool and dye products were important elements in exchange networks and wool could be used to finance international trade.¹³

The opportunity to work in a diachronic and comparative perspective with the ancient Aegean world (both Minoan and Mycenaean worlds) where sheep and wool were also predominant gives a perfect framework for the discussions.

2. Sources and methodologies

The main challenge of this joint work was to link different sources and methodologies. This is possible for recent excavations: among these for example, Arslantepe in Turkey and Ebla in Syria whose results are developed here. However, such examples are scarce. We could expect textiles or raw materials to be the main source of our knowledge. But unfortunately, as everybody knows, wool like all the organic materials is rarely preserved in archaeological soils. Thus, woollen archaeological samples are too scarce to be the sole foundation of this research. Other sources such as the written documents, mainly economic texts related to exchanges or ration system, can be used in this perspective, even if these documents are often elusive. But this is not enough with regards to the evolution of field and theoretical archaeology. Knowledge from animal bones collected on the sites, from experiments with ancient material or ethnographic evidence, or from iconographic data can illustrate one aspect of wool economy or another. For example, in the ancient Near East, textile remains are rare and fragmentary, with a few exceptional cases of preservation, such as at Chagar Bazar and Tell Shioukh Fawqani, both in Syria.¹⁴ Microscopic examination of these fragments, as well as of textile imprints on pottery, sealings, and tablets (such as at Khirbat al-Mudayna¹⁵ in Jordan), or of mineralized textiles on metals, together with a sound knowledge of spinning and weaving techniques, allows identification of fibres and how they were manipulated. These remains provide new sets of data on such matters as the textile economy, techniques, quality, decoration, and dyes. The results can then be compared to the data provided by texts that show sources, materials, and prices.

Thus, the ‘wool revolution’ and its impact on societies can be observed from the Near East to the Aegean in a multitude of sources and involving many different specialists: historians of texts and images, philologists, archaeologists, craftspeople testing techniques and textile tools, archaeozoologists. We chose to invite these many different specialists. The main goal was not to illustrate one source by another, but to link them within the framework of a multidisciplinary approach. Participants were asked to present systematic studies of the multiple aspects of wool in the economies of the various Near Eastern and Aegean states from the beginnings of writing until the end of the 1st millennium BC.

The workshop and its publication are driven by two complementary concepts that we tried to combine: the chronological and the multidisciplinary approach. Thus, the present book starts with an overview of the first evidences and the first

uses of wool, together with a presentation of the various methodological approaches. Then, several chapters deal with the system of wool rations and the trade in wool. And the last chapters deal with wool in institutionalized economies.

3. First evidence, first uses of wool and methodological approaches

The first chapters may be considered as methodological, highlighting the vast knowledge which is necessary for textiles studies (generally speaking), and the difficulties encountered by the confrontation of philological and archaeological data in early Mesopotamia.

Because of the poor state of the rare textile remains from Mesopotamia, the very well preserved Hallstatt sample of woollen textiles and fleeces represent a good case study. Despite the chronological and geographical differences, A. Rast-Eicher's analyses are highly useful in terms of comparison. They show a new methodological approach of ancient textiles which is now more accurate than the previous model held by M. Ryder on ancient fleeces. The latter model is still in use in Mesopotamian archaeology.¹⁶

An overview of the archaeology of wool in this area shows how human choices and environmental constraints act together (C. Breniquet). Such an interdisciplinary approach remains difficult because it is mainly based on ancient excavations. It is thus forced to rely on old reports which used traditional interpretations of archaeological objects, texts and iconography. Some wrong readings of archaeological records, especially in iconography, may complicate such a study. The *chaîne opératoire* helps to reconstruct ancient techniques, as shown by craftspeople and experimental archaeologists.

The role of the archaeozoology for understanding the development of the wool production needs to be emphasized. It shows the existence of two sheep varieties in the Chalcolithic Near East – large sheep with spiral horns and a hairy coat, and small sheep with coiled horns and a woolly coat – which are both found on images. A fat-tailed sheep is also attested by iconography since the Late Uruk period. As it is not possible to correlate directly bones and fleeces, iconography is integrated into the scientific approach as a mean of confirmation (E. Vila and D. Helmer).¹⁷ The second variety of sheep was preferred in the 3rd millennium and onwards in Northern Mesopotamia.



Practice of spinning. Scholars at work (from left to right): W. Sallaberger, M. G. Biga with A. Rast-Eicher P. Charvat, B. Palme (in the back), Ph. Abrahami, E. Andersson Strand, B. R. Foster, M.-L. Nosch

Experimentation and ethnoarchaeology also has an invaluable role to play, but these disciplines remain less used than in European archaeology. E. Andersson Strand, from the CTR, has developed many methods to make invisible and perishable artefacts (wool and textiles), in archaeological contexts, visible to the scientific community.¹⁸ This approach was developed with the material from Arslantepe, a newly excavated site in Turkey which provided tools and textiles from the Chalcolithic period. A cross-examination of the material by archaeologists and skilled craftswomen has shown a change of size of spinning tools from at the beginning of Period VIB2 (Early Bronze Age, c. 2900–2800 BC), and thus in spinning practice. Furthermore, the assemblages of loom weights witnessed a change in weaving technology allowing the production of finer fabrics (Romina Laurito, Cristina Lemorini, and Assunta Perilli).

To emphasize the importance of such experimentation, during the conference, an unusual experimental session was presented by two colleagues (E. Andersson Strand and A. Rast-Eicher). They brought different sheep fleeces and various spindles and showed how to use them, so that most of the participants could experiment with them. This experimental session demonstrated, better than any explanation, the technical skill involved in spinning and how time consuming the activity was within a traditional context of production. It made visible the difference between wool and goat hair qualities. It also made clear the different stages of cleaning and preparing wool for spinning, excluding the existence of carding for the period covered by the conference, because carding involves very specific tools which appear much later.

Documentation is renewed with the first written sources, the proto-cuneiform texts from the end of the 4th millennium BC. Archaeology plays a less important role because most of the excavations are old and badly documented (with the exception of Arslantepe and Ebla as already noted). The 3rd millennium sources were analyzed according to different complementary topics: translation of technical terms involved in wool craft, in names of clothes or fabrics), relationship to the power (wool for the king, wool distributed to the court), economic perspectives (frequency of wool deliveries in the ration system, monthly or annually, wool as a currency or measure, wool converted into silver, wool for exchanges, wool as a source of wealth, etc.), and organization of the labour (craft specialization, gender, etc.).

These uses of wool, as well as the control of new technologies for fabrics and clothes, and the existence of specific weights for wool,¹⁹ are parts of the economic and social mechanisms of the first urban states. Such conclusions can be drawn from the case study of the archaeological material and the textual evidence of the well-known Syrian site of Ebla dated to the second half of the 3rd millennium BC (L. Peyronel; M. G. Biga).

Such uses can also be found in the Aegean world, but it remains difficult to be sure whether wool and related techniques (like dyeing) were initially closely connected with institutions. Generally speaking, writing a new synthesis of the role of wool and dyeing in the Aegean world is beyond the possibilities offered by this workshop.²⁰ A few comments can be made for future researches. Wool is attested in Crete at the end of the 4th millennium. It starts to be used for clothes during the second half of the 3rd millennium (P. Militello).

4. Trade, exchange and the ration system

Since the first urban cities of the late Uruk period, the status of wool changed, or at least became clearer (P. Charvat).²¹ Wool was one of the commodities appearing most frequently as a means of payment, given to the workmen. The well-known Mesopotamian ration system is attested for the first time.²² The link between wool and power (chiefdom, royalty whatever its name) is also documented by the first written sources: wool and woollen textiles are collected as taxes, stored, redistributed to the people of the court, and of course are involved in long-distance exchanges.²³

With the Akkadian period (24–23th centuries), another step was reached. Wool became a raw material for increasing industrialization of commodity production (B. Foster). This interesting economic aspect has to be understood within the framework of a changing society where kinship relations become less important than previously, allowing the emergence of new social groups. The growing production and use of wool also increased the part played by women and herdsmen in Mesopotamian society.²⁴ Inspection documents from Tell Beydar (ancient Nabada, 24th century) witness an urban communal management of herds; shepherds were fully integrated into the urban community. At Lagaš and Ur, herds in the charge of nomads are controlled by the temple (W. Sallaberger). The 3rd millennium evidence demonstrates that wool was a *product*, and not just a raw material, whose quality is synonymous of a careful control of the animal herds and breeding, and of a skilled and organized workforce.

At Ebla, in the kingdom of Akkad or during the Ur III period,²⁵ wool was distributed as part of the ration for various categories of workers, mainly weavers working in large workshops. Such a distribution of salaries in kind (barley, wool and oil) is also well attested in the 2nd millennium sources. For example, the very new Mari textual evidence from the *šakkanakku* period (19th century) concerns flocks of sheep, as well as parts of the '*chaîne opératoire*' (production, cleaning and distribution of textiles (L. Colonna d'Istria). Wool rations, which might have been annual, varied according to the social status, the gender and the age of the recipients.

Wool also played a central role in trade in Mesopotamia, Anatolia and the Aegean. Several corpora of texts and archaeological artefacts have thus been analyzed for the 3rd and 2nd millennia;²⁶ when dealing with recent excavations, valuable help was also provided by archaeozoology.²⁷ Wool, as the main commodity in several 3rd millennium corpora, is used as a means of payment to buy various products; it is even sold in long distance trade. Mari documents from the next period (18th century),²⁸ as well as other corpora from upper Mesopotamia and Central Anatolia, provide important data about the wool trade and circulation, both in the institutional and private spheres. Palaces had important needs of wool for the production of textiles to cloth the royal family, the palace population, to distribute as allocations to its workers or to offer to foreign kings. Their textile production was almost exclusively for internal consumption and for diplomatic gifts.²⁹ However, the surplus of the private contemporaneous Assyrian production of textiles was sold abroad, in Anatolia (C. Michel). Assyrian merchants were also largely involved in the Anatolian local wool trade where most of the wool ended up in the Anatolian palaces or other major households where it was used for textile production (A. W. Lassen).

Old Babylonian texts from Southern Mesopotamian Sippar document the commercialization of the wool produced by the palace sheep.³⁰ The wool surplus of the palace flocks was given to entrepreneurs who entrusted it to merchants by credit sale contract, which they had to pay back in silver. These transactions concerned very small quantities implying that, as in the 18th century Mari, the palace's surplus was quantitatively unimportant (K. de Graef).

The Mycenaean period (15th-13th centuries, as shown by the Linear B palatial archives), is also well characterized by the importance of wool production and its use in the palatial economies.³¹ However, the documentation is biased because Linear B documentation is overwhelmingly found in palatial contexts. So, such an important use of wool has to be also explained regarding to the different parts of the Mycenaean territory (F. Rougemont).

The organization of the production seems to vary according to the site considered and the nature of the discoveries of the concerned areas. The Mycenaean texts present, as the Mesopotamian sources, philological and archaeological difficulties. However, the combination of different sources, allow the reconstruction, on scientific basis, the organization of sheep breeding (F. Rougemont) and the labour and consumption associated with wool (M.-L. Nosch). It is clear that wool is an important part of the Bronze Age Mycenaean palace economies. Palaces mobilize hundreds of men for managing the sheep flocks and the plucking of wool, and set annual production targets for groups of women workers in villages, characteristic of ration system, or *corvée* work.³² Sheep and wool are parts of the wealth of sanctuaries. Some smaller quantities of wool are allocated as 'donations' to divinities.

A peculiar link, attested by archaeology and epigraphy, between the Levantine coast and the Aegean has to be stressed. It concerns international exchanges in the Middle and Late Bronze Age in Mediterranean: textiles, dyes (purple) and probably non-local metals found in the Near East are concerned (V. Matoïan and J.-P. Vita). The introduction of purple to dye woollen fabrics may be already attested around 2000 in Crete, on the basis of the discovery of numerous crushed murex shells (P. Militello) among other possible archaeological evidence.³³ Thus, even if connections between the first purple-dye experiments and palatial institutions remain unclear, this technique for dyeing could have originated in Crete. As in the Mycenaean palaces, crossed analyses of archaeological and textual evidence from Ugarit on the Levant coast show that textiles and the clothing industry played a significant role in the economy of the kingdom (V. Matoïan and J. P. Vita). The organization of the collection of wool and of the textile workers in the 14th century palace of Nuzi, a site located east of the Tigris, echoes the Mycenaean ones.³⁴ There, texts detail the dyeing processing of wool as well as the many colors of this natural raw material. Wool served as a mean of payment both for purchases and for wages; it could be loaned, and is occasionally found in inherited goods (P. Abrahami).

5. Wool in institutionalized economies

From the second half of the 2nd millennium and on, Assyrian and Babylonian states show all the characteristics of mature institutionalized economies. Middle Assyrian sites, such as Armannu or Dūr-katlimmu (13th century), produced archives showing state-run sheep farms which production in wool was made into

textiles in workshops run by state dependents. These workers received wool both for work-assignments (*iškāru*), and for clothing (N. Postgate). The textiles produced by these workshops were destined for the king's family, palace staff and the army. In parallel, the surplus of private textile production was still commercialized. Thus, the household of Babu-aḥa-iddina at Aššur, organized textile production using dependent female workers as work-assignments. This household was also involved in long distance trade, sending textiles to the Levant. The Middle Assyrian sources allow us to review the technical terminology of wool and goat hair, the production processes and workers, and the range of attested woollen products, including felt and carpets. Curiously enough, the Assyrian documentation of the 1st millennium, less numerous, documents about the same aspects.

Sources from the Neo-Babylonian period belong mainly to temple archives and document the economic and administrative organization of these huge institutions. Wool played a crucial role in the economy of the Ebabbar at Sippar:³⁵ The surplus of its production represented a great source of income for the temple.³⁶ However, there are also a number of private archives belonging to families linked to the temple; some of these archives found at Sippar, show that sheep husbandry had a very high income: a herd of 36 sheep was enough for a whole large family (S. Zawadzki).

The last paper by F. Joannès deals with fabrics and clothes in wool and other raw materials during the Achaemenid and Seleucid periods. At that time, clothing was still a sign of cultural identity: clothes in religious context occurring in the documentation of the temples differed from the garments attested by the dowry inventories related to marriages contracts.

6. Perspectives

Our main goal has been to reconstruct the processes that led to the first form of industry in Antiquity, in both Near East and the Aegean, in the light of archaeological and historical data. These syntheses by millennia and areas show however that we were not able to cover the whole field of the initial topic. For example, the Hittite documentation has not been analyzed. In addition, the archaeological data for the 2nd and 1st millennium have not really been covered. We did not explore the sacred role of the fabrics nor the role of wool in temple economy (gifts for deities, possessions of temples, etc.). This can be explained in several ways. Firstly, textile studies imply a vast knowledge in different domains, needing a multi-disciplinary approach and comparisons with different cultural areas. This means that scholars should have a specific formation which is quite uncommon in our academic field. We must point also to the fact that documentation is very scattered in the literature: numerous papers or books need to be synthesized. A systematic approach to the ancient craft of textiles, via archaeology, texts and iconography, by involving all relevant specialists in highly specialized, collective projects, will yield a new comprehensive picture of the economic and cultural impact of textiles and textile manufacturing on society. Another long-term perspective would be to draw comparisons with Egypt. The hieroglyphic texts and images were produced by the elite who wore and used mainly linen textiles, but common people certainly spun and wove wool for their personal use. The western bank of the Nile was a large boggy area in which flocks of sheep might have been numerous.

This exploratory workshop and its publication have great potential for application to other crafts and material culture studies of the ancient Near Eastern world. International cooperation promoting increased exchange between research centres and creating a European network of researchers on textiles based on a wider perspective are highly desirable. Furthermore, the research will become embedded into the teaching activities of the institutions involved. The numerous archaeological and written sources from the ancient Near East and the Aegean give an enormous amount of data on wool, textile crafts, and clothing and allow the development of original research projects for various periods and areas. The project must be carried forward on a broader basis, so we hope to consolidate the approaches of archaeology and philology to develop new areas for collaboration, especially in field research. A systematic approach to the ancient craft of textiles, via archaeology, texts and iconography, by involving all relevant specialists in highly specialized, collective projects, will yield a comprehensive picture of the economic and cultural impact of textiles and textile manufacturing on society.

Selective Bibliography

- Alberti M. E. (2007) The Minoan Textile Industry and the Territory from Neopalatial to Mycenaean Times: First Thoughts. *Creta Antica* 8, 243–264.
- Alberti M. E. (2008) Murex Shells as Raw Material: the Purple-dye Industry and its By-products. Interpreting the Archaeological Record. *KASKAL* 5, 73–90.
- Andersson Strand, E. (2012) The Textile *Chaîne Opératoire*: Using a Multidisciplinary Approach to Textile Archaeology with a Focus on the Ancient Near East. *Paléorient* 38, 21–40.
- Andersson, E. et al. (2010) New Perspectives on Bronze Age Textile Production in the Eastern Mediterranean. The First Results with Ebla as a Pilot Study. *Proceedings of the Sixth International Congress of the Archaeology of the Ancient Near East 1*. 159–176. Wiesbaden.
- Ascalone, E. and Peyronel, L. (2006) *I Pesi da bilancia dell'età del Bronzo Antico e Medio. Materiali e Studi Archeologici di Ebla VII*, Roma.
- Barber, E. J. (1991) *Prehistoric Textiles. The Development of Cloth in the Neolithic and Bronze Ages, with Special Reference to the Aegean*. Princeton.
- Breniquet, C. (2006) “Dans le mouton, tout est bon”. Remarques sur les usages socio-économiques des animaux en Mésopotamie de la préhistoire récente au III^e millénaire avant J.-C. In C. Michel and B. Lion (eds) *De la domestication au tabou: le cas des suidés dans le Proche-Orient ancien*, 247–255. Paris.
- Breniquet, C. (2008) *Essai sur le tissage en Mésopotamie, des premières communautés sédentaires au milieu du 3^e millénaire avant J.-C.* Paris.
- Breniquet, C., Desrosiers, S., Nowik, W. and Rast-Eicher, A. (forthcoming) Les textiles découverts dans les tombes de l'âge du Bronze moyen à Chagar Bazar, Syrie. In Ö. Tunca and A. Baghdo (eds), *Chagar Bazar (Syrie) VIII. Les tombes ordinaires de l'âge du Bronze ancien et moyen des chantiers D-F-H-I (1999–2011). Études diverses*. APHAO. Publications de la Mission archéologique de l'Université de Liège en Syrie.
- Charpin, D. (1982) Marchands du palais et marchands du temple à la fin de la 1^{re} dynastie de Babylone. *Journal Asiatique* 270, 25–65.
- Charvat, P. (1997) *On People, Signs and States. Spotlights on Sumerian Society, c. 3500–2500 BC*, Prague.
- Charvat, P. (2011) Of Sheep, Sumerians and the Early State. In L. Vacin (ed.) *Ancient Near Eastern Studies in Memory of Blahoslav Hruška*, 49–60. Dresden.
- Crawford, H. (1973) Mesopotamia's Invisible Exports in the Third Millennium. *World Archaeology* 5, 231–241.
- Durand, J.-M. (2009) *La nomenclature des habits et des textiles dans les textes de Mari, t. 1*. Paris (ARM 30).
- Edens, C. 1992. Dynamics of Trade in the Ancient Mesopotamian 'World System'. *American Anthropologist* 94–1, 118–139.

- Englund, R. K. (1998) The Texts from the Late Uruk Period. In J. Bauer, R. K. Englund and M. Krebernik *Mesopotamien Späturuk-Zeit und Frühdynastische Zeit*, 15–233. Göttingen.
- Frangipane, M. *et al.* (2010) Arslantepe, Malatya (Turkey): Textiles, Tools and Imprints of Fabrics from 4th Millennium BCE. *Paléorient* 35–1, 5–29.
- Gelb, I. (1965) The Ancient Mesopotamian Ration System. *JNES* 24, 230–243.
- Gillis, C. and Nosch, M.-L. (eds) 2007. *Ancient Textiles. Production, Craft and Society*. Oxford.
- Graslin-Thomé, L. (2009). *Les échanges à longue distance en Mésopotamie au Ier millénaire. Une approche économique*, Orient et Méditerranée 5, Paris.
- Helbæk, H. (1959) Note on the Evolution and History of Linseed. *Kuml*, 103–129.
- Helmer D., Gourichon, L. and Vila, E., (2007) The Development of the Exploitation of Products from Capra and Ovis (Meat, Milk and Fleeces) from the PPNB to the Early Bronze in the Northern Near East (8700 to 2000 BC cal.). *Anthropozoologica* 42 (2), 41–69.
- Huot, J.-L. (1997) Comments on McCorriston 1997. *Current Anthropology* 38–4, 535–537.
- Huot, J.-L. (2000) Existe-t-il une 'révolution de la laine' au début de l'âge du Bronze oriental? In P. Matthiae *et al.* (eds) *Proceedings of the 1st International Congress on the Archaeology of the Ancient Near East*, 640–642. Rome.
- Kijas, J. *et al.* (2012) Genome-Wide Analysis of the World's Sheep Breeds Reveals High Levels of Historic Mixture and Strong Recent Selection. *PloS Biology* 10–2, 1–14.
- Killen, J. T. (1964) The Wool Industry of Crete in the Late Bronze Age, *BSA* 59, 1–15.
- Lambert, M. (1961) Recherches sur la vie ouvrière: les ateliers de tissage de Lagash. *Archiv Orientalni* 29, 422–443.
- Maekawa, K. (1980) Female Weavers and Their Children in Lagash: Pre-Sargonic and Ur III. *Acta Sumerologica* 2, 82–125.
- Matoian, V., and Vita, J.-P. (2009) Les textiles à Ougarit: perspectives de la recherche. *Ugarit-Forschungen* 41, 469–504.
- McCorriston, J. (1997) The Fiber Revolution. Textile Extensification, Alienation and Social Stratification in Ancient Mesopotamia. *Current Anthropology* 38–4, 5 17–549.
- Michel, C. (2006) Femmes et production textile à Aššur au début du IIe millénaire avant J.-C. *Techniques et culture* 46, 281–297.
- Michel, C. (2013) Assyrian Women's Contribution to the International Trade with Anatolia, *The Economic role of women in the public sphere in Mesopotamia: from the workshop to the marketplace, Second. International Workshop of the French-Japanese ANR programme Chorus REFEMA (Rôle économique des femmes en Mésopotamie ancienne)*, Tokyo, June 2013, online publication October 2013 (<http://refema.hypotheses.org/850>).
- Michel, C. and Nosch, M.-L. (eds) 2010. *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First millennia BC*. Oxford.
- Michel, C. and Veenhof, K. R. (2010) Textiles Traded by the Assyrians in Anatolia (19th-18th Centuries BC). In Michel and Nosch (eds), 2010, 209–269.
- Nosch M.-L. (2009) Les allocations de laine des tablettes en linéaire B de Thèbes. *Kadmos* 48, 77–92.
- Peyronel, L. (2004) *Gli strumenti di tessitura dall'età del Bronzo all'epoca persiana*. Roma.
- Rast-Eicher, A. (2005) Bast Before Wool. The First Textiles. In P. Bichler *et al.* *Hallstatt Textiles. Technical Analysis, Scientific Investigations and Experiment on Iron Age Textiles*. 17–131. Oxford.
- Rast-Eicher, A. and Bender Jørgensen, L. (2012) Sheep Wool in Bronze Age and Iron Age. *Journal of Archaeological Science* 000, 1–18.
- Rougémont Fr. (2009) *Contrôle économique et administration à l'époque des palais mycéniens (fin du IIème millénaire av. J.-C.)*. BEFAR 332. Athens.
- Rougémont Fr. (forthcoming) Les allocations de laine à Nuzi et dans le monde égéen. In *Palatial Economy in the Ancient Near East and in the Aegean: First Steps Towards a Comprehensive Study and Analysis. ESF Exploratory Workshop Convened by Pierre CARLIER, Francis JOANNES, Sèvres (France), September 17–18, 2010*.
- Rouault, O. (1977a) L'approvisionnement et la circulation de la laine à Mari d'après une nouvelle lettre du roi à Mukannishum. *Iraq* 39–2, 147–153.
- Rouault, O. (1977 b) *Mukannišum: l'administration et l'économie palatiales à Mari*. Archives Royales de Mari, 18. Paris.
- Ryder, M. (1993) Sheep and Goat Husbandry, with Particular Reference to Textile Fibre and Milk Production. *Bulletin on Sumerian Agriculture* 7–1, 9–32.

- Ryder, M. (2007) *Sheep and Man*. London (reprinted from the 1983 edition).
- Sauvage, C. (2012) Spinning from Old Threads: The Whorls from Ugarit at the Musée d'Archéologie Nationale (Saint-Germain-en-Laye) and at the Louvre. In M.-L. Nosch, H. Koefoed and E. Andersson Strand, *Textile Production and Consumption in the Ancient Near East, Archaeology, Epigraphy, Iconography*, 189–214. Ancient Textiles Series 12. Oxford
- Sudo, H. (2010) The Development of Wool Exploitation in Ubaid-Period Settlements of North Mesopotamia. In R. Carter and G. Philip (eds) *Beyond the Ubaid. Transformation and Integration in the Late Prehistoric Societies of the Middle East*. Chicago. 169–179 (SAOC 63).
- Van Zeist, W. and Bakker-Heeres, J. (1974) Evidence for Linseed Cultivation before 6000 BC. *Journal of Science* 2, 215–219.
- Veenhof, K. R. (1972) *Aspects of Old Assyrian Trade and its Terminology*. Studia et Documenta 10. Leiden.
- Vila, E. (1998) *L'exploitation des animaux en Mésopotamie aux IV^e et III^e millénaires avant J.-C.*, Paris.
- Vila, E. (2002) L'évolution de la taille du mouton dans le nord de la Mésopotamie: les faits et leurs causes. In L. Bodson (ed.), *D'os, d'image et de mots. Contribution à la réflexion sur les sources de l'histoire des connaissances zoologiques*, 47–79. Colloques d'histoire des connaissances zoologiques 13. Liège.
- Waetzoldt, H. (1972) *Untersuchungen zur Neusumerische Textilindustrie*. Roma.
- Waetzoldt, H. (1980) Leinen. *Reallexikon der Assyriologie und vorderasiatischen Archäologie*, 583–594.
- Zaccagnini, C. (1984) The Terminology of Weight Measures for Wool at Ebla. In P. Fronzaroli (ed.), *Studies on the Language of Ebla. Quaderni di Semitistica* 13, 189–204.
- Zawadzki, S. (2006) *Garments of the Gods: Studies on the Textile Industry and the Pantheon of Sippar According to the Texts from the Ebabbar Archive*. OBO 218. Fribourg-Göttingen.
- Zawadzki, S. (2002) Payment of Wool in the Economy of the Ebabbar Temple at Sippar. *RAAO* 96, 149–167.
- Zeder, M. (1994) Of Kings and Shepherds: Specialized Animal Economy in Ur III Mesopotamia. In G. Stein and M. Rothman (eds) *Chiefdoms and Early States in the Near East. The Organizational Dynamics of Complexity*, 175–191. Madison.

1 The proceedings of this conference remain unpublished.

2 McCorriston 1997. Huot 2000.

3 Rast-Eicher 2005.

4 Helbaek 1959. Van Zeist and Bakkers-Heeres 1974.

5 Waetzoldt 1980.

6 Breniquet 2006. Sudo 2010.

7 Waetzoldt 1972 for a famous study.

8 Michel 2006 and Michel 2013 for a domestic textile production during the first centuries of the 2nd millennium BC.

9 Lambert 1961; Maekawa 1980.

10 Veenhof 1972; Michel and Veenhof 2010.

11 Kijas *et al.* 2012.

12 Charpin 1982.

13 Graslin-Thomé 2009.

14 For Chagar Bazar, see Breniquet *et al.* forthcoming.

15 Communication by E. Andersson Strand.

16 Ryder 1993, 2007.

17 Vila 1998, 2002.

18 Andersson Strand 2012.

19 Ascalone and Peyronel 2006; Zaccagnini 1984.

20 For a general study see Barber 1991.

21 Charvat 1997, 2011, after Englund 1997.

22 Gelb 1965.

23 Crawford 1973; Edens 1992.

24 Huot 1997, 536.

25 Zeder 1994.

26 Peyronel 2004 for the historical periods. Matoian and Vita 2009 and Sauvage 2012 for Ugarit.

- ²⁷ Helmer, Gourichon and Vila 2007.
- ²⁸ Most of the texts from Mari dealing with wool have been gathered by Durand 2009.
- ²⁹ Rouault 1977a and 1977b.
- ³⁰ Charpin 1982.
- ³¹ Killen 1964. Rougemont 2009.
- ³² Nosch 2009.
- ³³ The most up-to-date studies on purple have been written by Alberti 2007 and 2008.
- ³⁴ Rougemont forthcoming.
- ³⁵ Zawadzki 2002.
- ³⁶ Zawadzki 2006.

1. Bronze and Iron Age Wools in Europe

Antoinette Rast-Eicher

The beginning of wool use is closely linked to the domestication of sheep and the introduction of woolly sheep in Europe. The archaeological material is not complete for the early periods – especially where textiles are concerned. Perishable items are the most fragile material in the archaeological record, and therefore preservation is always a problem. Bone remains and textile tools are therefore other important sources for investigating the use of fibres.

For the Neolithic period the best conditions for textile survival are found in lake dwellings, where hundreds of textiles have been preserved.¹ Unfortunately the soil is alkaline and animal fibres do not survive in such soils. The question of the use of wool therefore remains unresolved. Ancient wool textiles have been preserved in acid soils, such as the bogs in northern Europe, and this is true of Bronze Age textiles in particular, but there are virtually no examples of textiles made from wool dating to the Neolithic in Scandinavia. In such soils, plant fibres are badly preserved.

Here, the term textiles, is used according to the definition put forward by Seiler-Baldinger.² It therefore includes material made using non-woven techniques, which are very important in the Neolithic periods.

The results presented here, especially the new measurements, are based on the analyses performed for the CinBA-project.³

1. Results from Archaeozoology

Sheep were domesticated in the Near East during the PPNB (from 7500 BC) at the latest. *Ovis orientalis* is the most probable wild ancestor of our domesticated sheep.⁴ It had a hairy coat with fine underwool and kemp fibres.

Generally, there are several points of discussion:

- The marker for domestication is defined by a size reduction of the animals. Flock management has been observed, e.g. in Central Anatolia c. 12,000 and 10,400–9400 BP and in Zawi Chemi Shanidar/Iran, 10,870 ± 300 BP. In Cyprus non endemic and domesticated species have been found in layers dated 10,500–9000 BP.⁵
- The bones of sheep and goat are often difficult to differentiate. Therefore, the statistical number tends to be small.
- Neolithic life spread from Cyprus towards Europe (8000 BP in Italy/Puglia and southern France) and through Greece and the Danube region. Early flax in Italy dates to the seventh millennium BC.⁶

In order for woolly sheep to come about, a genetic change had to occur. Hairy

sheep (also the mouflon) have an undercoat that grows in the winter, moulting in late spring; woolly sheep grow it all year without moulting. Hairy sheep are short tailed. By 3000 BC there was a change in the Near East in the horn form resulting in hornless ewes, and to long-tailed sheep in western Asia and to a woolly fleece. By the Early Bronze Age hornless sheep were known in Europe (Switzerland), a sign of a new breed of sheep or by selective breeding (around 2000 BC).⁷ In Egypt long-tailed sheep are known from the Middle Kingdom (1991–1633 BC).⁸ Hairy fleeces with yearly moulting were harvested by plucking or rooing; in Europe, clipping with shears began during the Iron Age.⁹ Generally, in the Late Neolithic cultures sheep management shifted towards larger flocks and later slaughtering patterns, and a larger sheep type is recorded in the Corded ware culture (2750–2400 BC); this has been interpreted as the result of another development in area management characterized by a move towards utilising more open grassland, a theory which is supported by results in archaeobotany. During the Bronze Age the amount of sheep bones in excavation finds rises.¹⁰

2. Textile tools

In the early periods, when remains of wool are scarce, the textile tools can provide some important information. Some tools from Switzerland appear to have undergone a big change around 3000 BC. The spindle-whorls transformed from discoid shape, which is common in the Early Neolithic, to bi-conical, which remained a standard form throughout the Bronze Age. Loom weights for the warp-weighted loom are another indication. During the Corded ware culture they changed from the pyramidal shapes common in the earlier Neolithic cultures to round ones. The compact whorls turn quicker, and are more ideal for animal fibres. These changes are interpreted as reflecting the introduction of sheep wool.¹¹

3. Wool measurements

Wool measurements are the basic information about wool quality and even today are still relevant in industry. The method was first applied for archaeological material in the 1960s by M. L. Ryder, and revised by Rast-Eicher.¹² Fleece types reflect fleeces and not necessarily processed wool in textiles. This difference is important as even as early as the Bronze Age wool had already been processed. Generally, we can talk about four main groups of wool defined earlier by Stieger¹³ (Fig. 1.1).

a) Hairy wools with more than 3/4 of the fibres under 25 µm (meaning that most of it is underwool) and coarse (kemp) fibres;

b) Wool with mixed fibre types (producing a bimodal histogram);

c) Sheep with coarse and fine fibres, and

d) Fine wools.

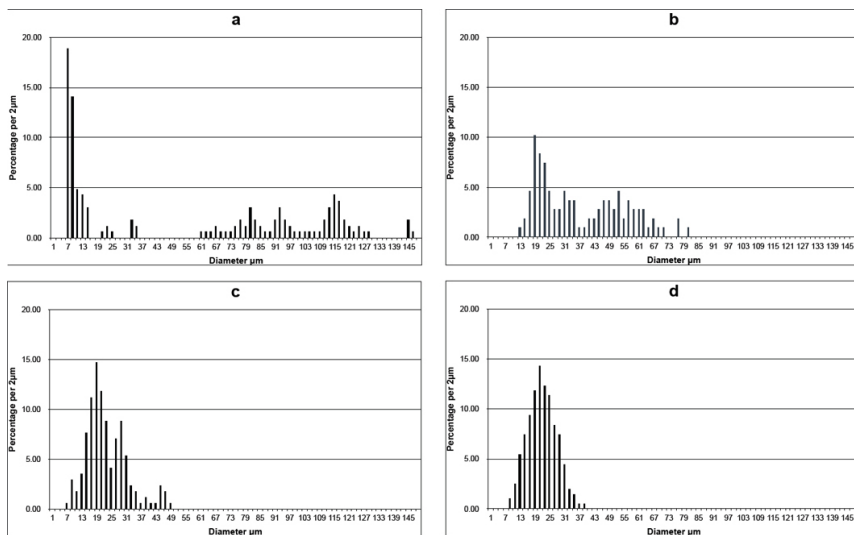


Fig. 1.1. The main types of sheep fleeces defined by G. Stieger. Graphs: A. Rast-Eicher.

Most of the Bronze Age wools are hairy wools. In the Iron Age wools with mixed fibre types (bimodal graphs) are dominant. In most of the cases the Bronze Age wool corresponds to type a), whereas Iron Age wool tends to be of type b).

The CinBA-project has provided the opportunity to measure a large number of skins and textiles dated to the Bronze Age and Iron Age. Most important is the comparison between skins and textiles found in the salt mines from Hallstatt (A). Textiles from many parts of Europe have added further important information about wool quality and processing (Figs. 1.2 and 1.3).¹⁴

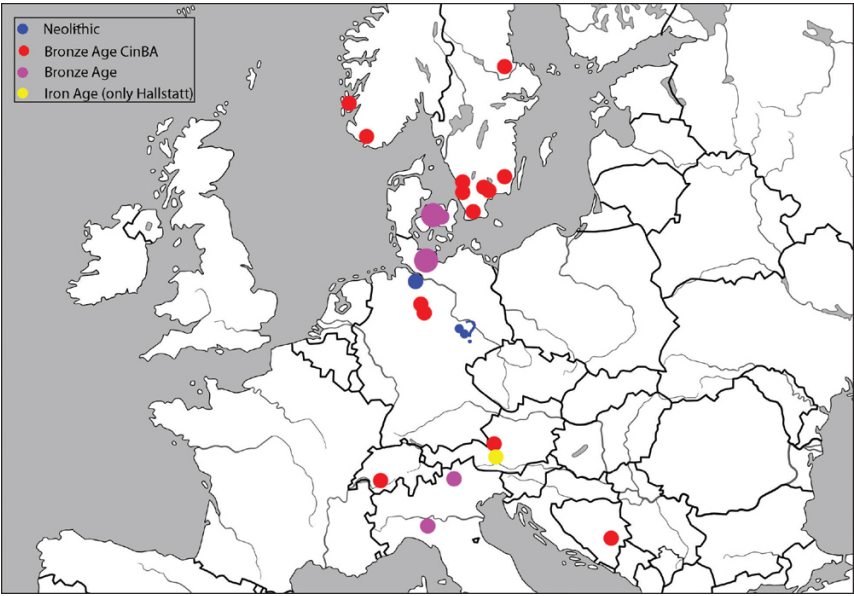


Fig. 1.2. Map of the material discussed. The Bronze Age material from Denmark and north Germany (except Lüneburg culture) is not included in the CinBA project (pink dots). Graph: A. Rast-Eicher.

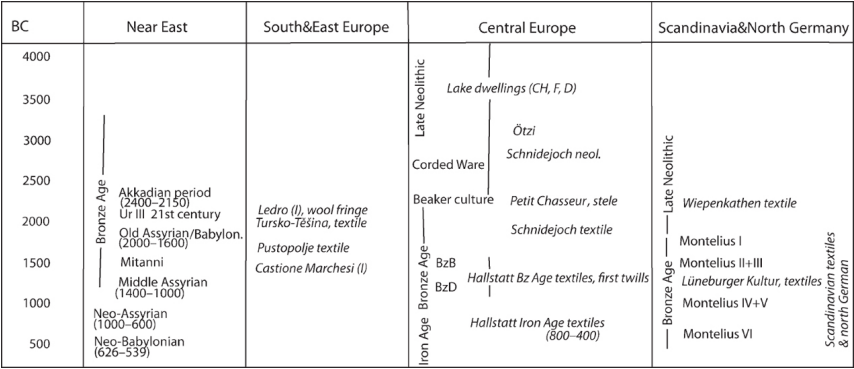


Fig. 1.3. Chronology of the material discussed in the text. A. Rast-Eicher.

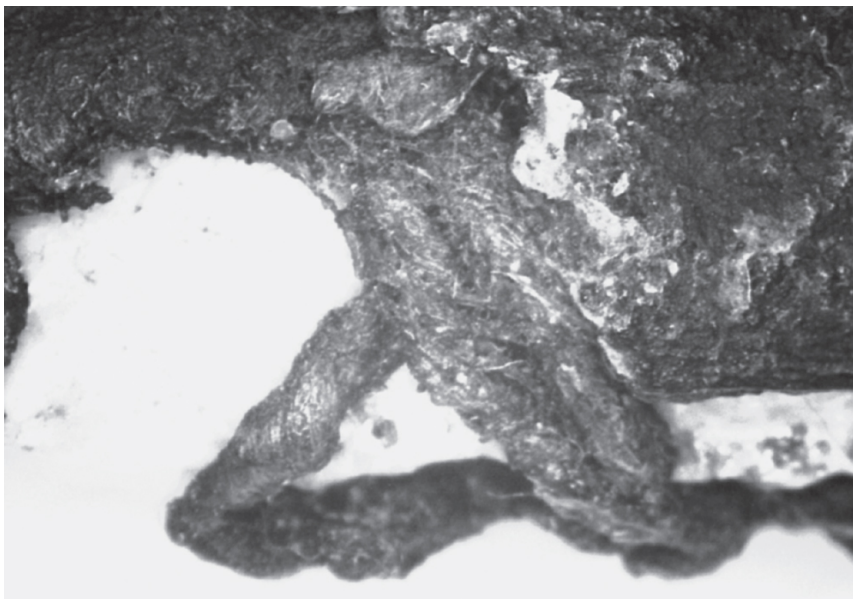


Fig. 1.4. Threads around, the flint dagger of Wiepenkathen (D, Kreis Stade). Photo: A. Rast-Eicher.

4. Neolithic textiles

Bast fibres – tree basts and flax – were the first fibres used for textiles. Many different objects for everyday use have been made from tree basts, such as lime or willow bast. We can differentiate between three-dimensional objects such as sieves, baskets or hats, and two-dimensional objects, flat textiles made in a twining or woven technique. Twining is the most important textile technique in the Neolithic period. Very fine objects are on first sight difficult to differentiate from woven textiles, and their function is probably the same.¹⁵

Most of the Neolithic textiles have been found in alkaline soils and are therefore made of plant fibres. Neolithic wool textiles are very rare indeed in Europe,¹⁶ and their analysis was undertaken many years ago using old methods. Some were lost during the Second World War. Depending on the preservation, new methods such as scanning electron microscopy could produce a more secure fibre analysis. One of the textiles in question was found near Hamburg, at Wiepenkathen (Museum of Stade). It had been placed around the handle of a Late Neolithic flint dagger. The textile was wedged between the flint and the well-preserved wooden handle of the dagger. According to the analysis by von Stokar in the 1930's it is a woollen tabby weave.¹⁷ At the time of von Stokar's investigation, the wooden handle was taken away for conservation and was later put back, so that now only a few threads are visible. A recent investigation of this object by the author confirms that it is very probably wool (Fig. 1.4). Unfortunately, due to the small size of the remains it was not possible to take a sample.

Two other textiles found in eastern Germany, at Dittfurt/Spitzes Hoch (Kreis Bernburg) and Kreienkopp (Kreis Quedlinburg), are made of wool according to

Schlabow's analysis; however, a later analysis by the National Museum of Denmark concluded the examples were of vegetable fibres.¹⁸

We can assume that the first use of wool was during the Late Neolithic period, and according to the Bronze Age finds it must have been a hairy fleece. Processing wool fibres for textiles was probably less important than the use of skins. Two glacier finds have proved that the main Neolithic garments for a cold climate are made of skin. The upper layer is a sort of rain garment to prevent the skins from becoming wet. Thus, the man from the Similaun-glacier (Italy) (called 'Ötzi') wore skin (goat, bear, lamb, deer) and over the skins a mantle made of grass (in a twining technique).¹⁹ Neolithic objects (bow, arrows) and garments, which are assumed to belong to the same person (C-14 dated), have also been found in an ice patch from the Schnidejoch (Switzerland). But the individual associated with the finds has not yet been recovered. The garments consist of a large part of goat-skin trousers, shoes and a fragment of a mantle made of willow bast.²⁰ The DNA analysis of the trousers proved the goat to be of an Asian type which has not been found in Europe to date.²¹ The combination of skin and 'raincoat' made of plant fibres is typical for arctic garments. In arctic regions similar 'raincoats' have also been made of fish-skin or gut.²²

Other garments were obviously worn in warmer regions. The anthropomorphic stele of the Late Neolithic graves (Beaker culture) from Sion Petit-Chasseur (CH) shows a range of interesting lozenge- and wave-shaped patterns on a garment that was held in place by a girdle (Fig. 1.5). The girdle is of the same type (with the same end-loop!) as a girdle from Ledro in Italy which is dated to the Early Bronze Age and which is decorated with wool (see below). To create patterns with linen threads is not exactly obvious or easy. Embroidery is one option, such as the famous linen textile from Pfäffikon-Irgenhausen (CH) dated to the Middle Bronze Age.²³ Another method is to weave patterns. To obtain patterns similar to those depicted on the Sion's stele, twill would be much more appropriate than tabby. Twills are much easier to weave with wool than linen, especially across big surfaces. Among the material from Ledro there is a girdle end with a lozenge twill decoration.²⁴ Therefore, we could regard the stele from Sion as probably the earliest depiction of woollen garments.²⁵ The later (Middle Bronze Age) twills from Hallstatt have been woven as diagonal or chevron twills (see below).

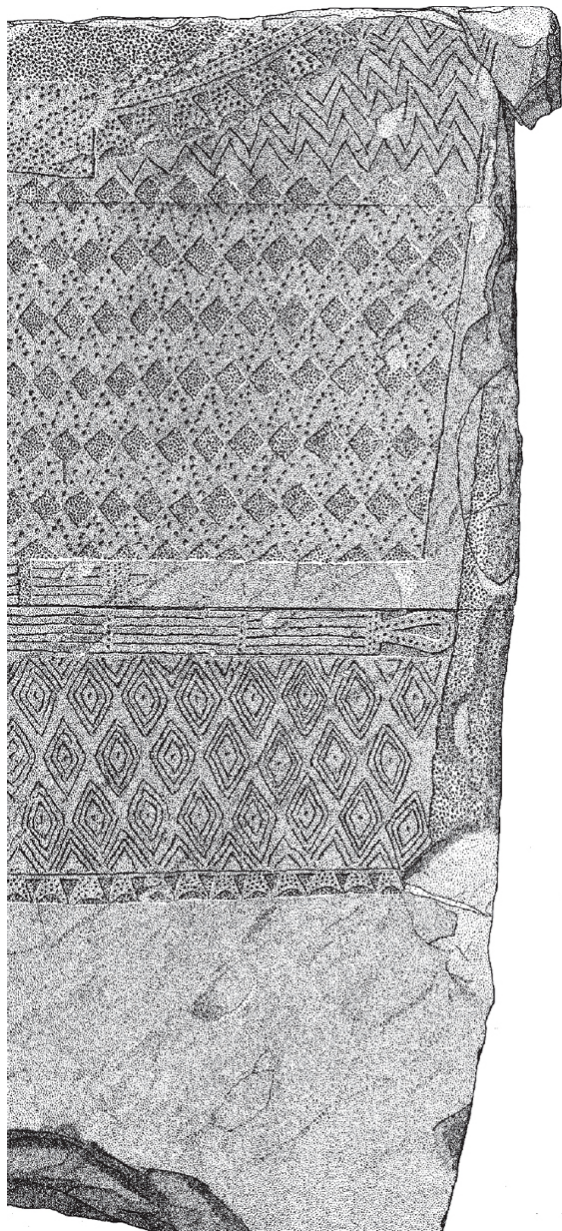


Fig. 1.5. Sion Petit-Chasseur (CH), anthropomorphic stele with engraved garments. Drawing: S. Favre, Département d'Anthropologie, Université de Genève.

5. Bronze Age

The use of wool as a textile fibre seems to increase in the Bronze Age. The costume included large bronze pins which were certainly better for wool than linen textiles.

Wool textiles got less damage as the threads are more flexible than linen threads. First finds from graves with mineralised textiles show how they were worn.²⁶

Early Bronze Age finds come from the glacier find Lenk-Schnidejoch (Switzerland),²⁷ a tabby-weave and some decorative threads for the buttonhole and fringe of the girdle from Lago di Ledro (Italy/Trentino).²⁸ Based on the C14-dating (1891–1634 BCcal) the textile from Lenk-Schnidejoch (CH) is one of the oldest well-preserved wool textiles found in Europe (Fig. 1.6). Another early wool textile has been found at Pustopolje, Bosnia-Herzegovina.²⁹ A large piece, nearly 1.7×3 m, remained in wet conditions in a chamber grave. The wool of both early textiles is of typical Bronze Age quality with a lot of fine underhair and, especially in the example from Pustopolje, with a lot of kemp fibres (Fig. 1.7). The Schnidejoch textile was clearly made with better processed fibres – the coarse kemp were nearly all taken away. This wool type corresponds to that of the Soay sheep: short, brown, light underwool, hairy.

Further east, in the Czech Republic, Early Bronze Age textiles have been found, among them a wool textile in the graveyard from Tursko-Těšina; this example has been mineralised on a bracelet. It belongs to the Únětice culture and is dated by typology to the Early Bronze Age (around 2000 BC).³⁰ So far, this seems to be the oldest Bronze Age wool textile in Europe.

Many wool textiles have been found dating to the Middle Bronze Age (in central European chronology, see Fig. 1.3), about 1500–1350 BC. In particular, many of these derive from the famous oak-log coffins from Denmark and north Germany, as well as from bogs in northern Europe and the Lüneburg culture in Germany. The salt-mines from Hallstatt (A) are another major source. Most of the examples are made of the typical hairy Bronze Age wool (type a, Fig. 1.1), but some are more special. The first twills, made of dyed wool, have been found in Hallstatt. The Bronze Age twills from Hallstatt have been woven as 2/1, 2/2 or chevron twills.³¹ The microscopic analysis and the wool measurements have shown that this wool is nearly white and different from the usual Bronze Age wool type.³² The influence of a new breed seems to have slowly changed the wool quality in Europe. And this is a milestone, because from this time on dyed wool and more ornate patterns became possible.



Fig. 1.6. Lenk-Schnidejoch (CH), Bronze Age wool textile. Photo: A. Rast-Eicher.



Fig. 1.7. Pustopolje (Bosnia-Herzegovina), detail of a piece of wool textile with numerous kemp fibres visible and sticking out. Photo: K. Grömer.



Fig. 1.8. Iron Age textile from the salt mines of Hallstatt (inv. NHM 75.973). Photo: NHM Vienna.

6. Iron Age

Our knowledge about Iron Age textiles is based on many grave finds and the textiles from the salt mines in Hallstatt (Fig. 1.8).³³ Now, the number of wool textiles which have been found is quite high. The long stapled and white wools become common, and colours and very different patterns show up. We can see that the weavers experimented with the different possibilities that bright colours and special yarns offered. The finer or more special the textile, the more selected and processed are the fibres.³⁴ By the Early Iron Age, but maybe also earlier (see above), wool garments were a new medium for expressing oneself and communicating social differentiation – and this was because white wool which could be dyed had become generally available as a textile fibre.

The use of wool in Europe is very likely to have started during the Neolithic period: rare finds and discernible changes in tools, larger sheep and flock management show that sheep wool was used for textile fibre production at the latest by the second half of the 3rd millennium BC. During the Bronze Age wool processing became an important practice, and fine twills made of dyed wool appeared in central Europe by the Middle Bronze Age.

Acknowledgements

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Trondheim/N) for reading the manuscript and Karina Grömer (Naturhistorisches Museum Wien/A) for providing photos. I would also like to thank Kristin Bornholdt Collins who revised the text into proper English.

Bibliography

- Belanová-Štolcová, T. (2012) Slovak and Czech Republics. In M. Gleba and U. Mannering (eds), *Textile and Textile Production in Europe*, 306–331. Oxford.
- Bazzanella A. and Mayr A. (2009) *I reperti tessili, le fusaiole e i pesi da telaio dalla palafitta di olina di Ledro*. Trento.
- Bazzanella A. (2012) Italy: Neolithic and Bronze Age. In M. Gleba and U. Mannering (eds), *Textile and Textile Production in Europe*, 203–214. Oxford.
- Benac, A. (1986) *Praistorijski tumuli na Kupreskom Polju*. Akademija nauka i umjestnosti Bosnie e Hercegovine, Djela, knjiga LXIV, Centar za Balkanološka Ispitivanja knjiga 5. Sarajevo.
- Benac, A. (1990) Recently Excavated Bronze Age Tumuli in the Kupresko polje, Bosnia, Yugoslavia. *Antiquity* 64, 327–333.
- Bender Jørgensen, L. (1992) *Northern European Textiles until AD 1000*. Aarhus.
- Cassau, A. (1935) Ein Feuersteindolch mit Holzgriff und Lederscheide aus Wiepenkathen, Kreis Stade. *Mannus* 27, 199–209.
- Chaix, L. (1977) Les moutons préhistoriques de la Haute Vallée du Rhône (Valais/Suisse). *Ethnozootechnie* 21, 71–78.
- Gleba, M. and Mannering, U. (eds) (2012) *Textiles and Textile Production in Europe*. Oxford.
- Grömer, K. (2012), Austria: Bronze- and Iron Ages. In M. Gleba and U. Mannering, *Textile and Textile Production in Europe*, 27–64. Oxford.
- Grömer, K., Kern, A., Reschreiter, H. and Rosel-Mautendorfer, H. (eds) (2013) *Textiles from Hallstatt: Weaving Culture in Bronze Age and Iron Age Salt Mines*, Budapest.
- Hornstrup, K. M., Olsen, J., Heinemeier, J., Thrane, H. and Bennike, P. (2012) A New Absolute Danish Bronze Age Chronology as Based on Radiocarbon Dating of Cremated Bone Samples From Burials. *Acta Archaeologica* 83, 9–53.
- King, J. C. H. and Pauksztat, B., and Storrie R. (eds) (2005), *Arctic Clothing of North America – Alaska, Canada, Greenland*. Montreal/Kingston.
- Lomborg, E. (1973) *Die Flintdolche Dänemarks*. Kopenhagen.
- Meadows, J. R. R. S., Li, K., Kantanen, J., Tapio, M., Sipos, W., Padeshi, V., Gupta, V., Alvo, J. H., Whan, V., Norris, B. and Kijas, J. W. (2005) Mitochondrial Sequence Reveals High Levels of Gene Flow Between Breeds of Domestic Sheep from Asia and Europe. *Journal of Heredity* 96, 494–501.
- Médard, F. (2010) Switzerland: Neolithic period. In M. Gleba and U. Mannering (eds), *Textile and Textile Production in Europe*, 367–377. Oxford.
- Rast-Eicher, A. (1997) Die Textilien. In J. Schibler, H. Hüster-Plogmann, S. Jacomet, C. Brombacher, E. Gross-Klee and A. Rast-Eicher (eds), *Ökonomie und Ökologie neolithischer und bronzezeitlicher Ufersiedlungen am Zürichsee*. Monografie der Kantonsarchäologie Zürich 20, Zürich/Egg, 300–328.
- Rast-Eicher, A. (2005) Bast Before Wool. In P. Bichler, K. Grömer, R. Hofmann-de Keijzer, A. Kern and H. Reschreiter, (eds), *Hallstatt Textiles – Technical Analysis, Scientific Investigation and Experiment on Iron Age Textiles*. British Archaeological Report S1351, 117–135. Oxford.
- Rast-Eicher, A. (2008) *Textilien, Wolle, Schafe der Eisenzeit in der Schweiz*. Antiqua 44. Basel.
- Rast-Eicher, A. (2012) Switzerland: Bronze and Iron Ages. In M. Gleba and U. Mannering (eds), *Textile and Textile Production in Europe*, 378–398. Oxford.
- Rast-Eicher (in press) Schnidejoch: Neolithische, bronzezeitliche und römische Geflechte und Gewebe. In A. Hafner (ed.), *Schnidejoch und Lötschenpass*. Printed as monography of the Archaeology of Bern. Bern.
- Rast-Eicher, A. and Bender Jørgensen, L. (2013), Sheep Wool in Bronze and Iron Age Europe. *Journal of Archaeological Science* 40, 1224–1241.
- Rocha J. and Shanyuan Chen S. and Albano Beja-Pereira A. (2011) Molecular Evidence for Fat-tailed Sheep Domestication. *Tropical Animal Health and Production* 43, 1237–1243.
- Ryder, M. (1990) Bronze Age Wool. *Journal of Danish Archaeology* 7, 1988, 136–143.

- Schlumbaum, A., Campos P. A., Volken, S., Volken, M. and Hafner, A. (2010) Neolithic Leggings from the Swiss Alps and the Early History of Goat. *Journal of Archaeological Science* 37, 1247–1251.
- Schibler, J. (2008), Die wirtschaftliche Bedeutung der Viehzucht während des 3. Jahrtausends v. Chr. aufgrund der Tierknochenfunde der Fundstellen im Alpenvorland. In W. Dörfler and J. Müller, J. (eds), *Umwelt – Wirtschaft – Siedlungen im dritten vorchristlichen Jahrtausend Mitteleuropas und Südschwabens*, Internationale Tagung Kiel 4.–6. November 2005, 379–392. Neumünster, OFFA 84.
- Seiler-Baldinger, A.-M. (1991) *Systematik der Textilien Techniken*. Basel.
- Sidi Mamar, H. and Gilloz P.-A. (1995) Pour une archéologie de la maisonnée: espaces des déchets et modes de subsistance d'une communauté villageoise alpine du 1er Age du Fer (Brig-Glis/Waldmatte, Valais, Suisse): Essai critique et résultats préliminaires. *Anthropozoologica* 21, 171–187.
- Stieger, G. (1888) *Studien zur Monographie der Heidschnucke. Beitrag zur Rassenkunde der landwirtschaftlichen Haustiere*, Halle.
- Suter, P., Hafner, A. and Glauser, K. (2005) *Lenk – Schnidejoch. Funde aus dem Eis – ein vor- und frühgeschichtlicher Passübergang. Archäologie im Kanton Bern*, Band 6B, 499–522. Bern.
- Vretemark, M. (2010) Subsistence Strategies. In T. Earle and K. Kristiansen (ed.), *Organizing Bronze Age Societies. The Mediterranean, Central Europe, and Scandinavia Compared*, 155–184. Cambridge.
- Zeder, M. A. (2008) Domestication and Early Agriculture in the Mediterranean – Basin: Origins, Diffusion, and Impact. *Proceedings of the National Academy of Sciences of the United States* 105:33, 11597–11604.

1 E.g. Rast-Eicher 1997; Rast-Eicher 2005.

2 Seiler-Baldinger 1991.

3 Rast-Eicher and Bender Jørgensen 2013. The project Creativity in Craft Production in Middle and Late Bronze Age Europe (CinBA) is financed by HERA. For further details see <http://cinba.net>

4 Meadows *et al.* 2005.

5 Zeder 2008.

6 Bazzanella 2010.

7 Chaix 1977; Sidi Mamar and Gilloz 1995; Vretemark 2010.

8 Rocha *et al.* 2011.

9 Rast-Eicher 2008, 95.

10 Schibler 2008.

11 Rast-Eicher 2005.

12 Rast-Eicher 2008.

13 Stieger 1888.

14 Rast-Eicher 2008; Rast-Eicher and Bender Jørgensen 2013. For the Scandinavian chronology, see also Hornstrup *et al.* 2012.

15 Rast-Eicher 2005; Médard 2012.

16 Ryder 1990, 136. Ryder was adamant that there were no Neolithic wool textiles.

17 Cassau 1935; Bender Jørgensen 1992, 51. Lomborg 1973, 32–35: Wiepenkathen belongs to his type I, a late Neolithic type of flint daggers.

18 Bender Jørgensen 1992, 51 (see also note 7) and 224. Spitzes Hoch is dated to the Beaker culture, Kreienkopp is earlier than the Corded Ware culture.

19 Bazzanella 2010, 205.

20 Suter *et al.* 2005.

21 Schlumbaum *et al.* 2010.

22 King *et al.* 2005.

23 Rast-Eicher 2010

24 Bazzanella and Mayr 2009, 75. Linen twills have also been found in Hallstatt (diagonal twills), see Grömer 2010, 32.

25 Rast-Eicher 2012.

26 Rast-Eicher 2012, 383.

27 Rast-Eicher in press.

28 Bazzanella and Mayr 2009, 78.

29 Benac 1986; Benac 1990.

30 Belanová-Stolcová 2012, 309; also, Belanová-Stolcová pers. comm.

³¹ Grömer 2012, 32; Grömer *et al.* 2013.

³² Rast-Eicher and Bender Jørgensen 2013.

³³ Gleba and Mannering 2012. See the different articles in this book about the Iron Age material from across Europe.

³⁴ Rast-Eicher and Bender Jørgensen 2013.

2. The Expansion of Sheep Herding and the Development of Wool Production in the Ancient Near East: An Archaeozoological and Iconographical Approach

Emmanuelle Vila and Daniel Helmer

Introduction

Archaeozoological studies based on the analysis of culling strategies have established that fleece exploitation appeared shortly after sheep domestication. At present it is not possible to follow exactly the evolution from the hair found on wild sheep to the wool of domesticated sheep. Nevertheless at the end of the 4th millennium BC and the beginning of the 3rd millennium a major change becomes visible through the herding practices and morphometrical and iconological data. These changes may relate to wool evolution and production. Caprine remains dominate the archaeological fauna and indicate the expansion of pastoral herding which played a role in the development of livestock production, particularly in the production of wool. This apparent growth in production was probably brought about by the increasing demand for textiles in response to the socio-economic development associated with the beginning of urbanization and the development of cities.

1. Caprines pastoralism in Northern Mesopotamia

Fundamental changes in the relationship between man and animal occurred at the transition from hunting-gathering societies to those practicing livestock-breeding and agriculture. The last stage of this transformation known as the Neolithic Revolution reveals the first manifestations of herding at sites along the southern foothills of the Taurus Mountains in Turkey during the early PPNB (around 8500 BC) and, at some later stage, at the middle course of the Euphrates river in Syria.¹ This region corresponds with an area of natural spread of wild cereals as well as with the natural environment of the domestic ungulates' precursors, such as the eastern mouflon (*Ovis orientalis*), the wild goat (*Capra aegagrus*), the aurochs (*Bos primigenius*) and the wild boar (*Sus scrofa*). This is also the region, in which farming communities that settled for at least one part of the year, successfully managed to domesticate wild ungulates, including sheep. Sheep, in fact, turned out to be particularly well adapted to the different geo-climatic zones of this region.

From an osteological point of view, one of the effects of its domestication was the morphological alteration of the horns, whose section changed from a triangular shape with mouflon to a now oval one with domestic sheep. Another consequence is directly related to life in captivity and consisted in the decrease in size, due amongst others, to stress and nutritional deficiency.²

Archaeozoological research into the development of herding practices for sheep and goats in the Northern Near East from the beginnings of animal domestication during the 9th millennium BC cal. up to the development of urbanism in the 3rd millennium BC (Early Bronze Age) has shown that Neolithic communities were able to benefit from sheep breeding at a very early stage;³ varieties were selected along criteria relating to meat and secondary products, or products obtained from the living animals, i.e. milk and fleece.⁴ Herd structures and slaughter profiles reveal that ewe milk was sought after from the middle of the PPNB onwards, and a little later, around 6500 BC, that sheep were kept for their fleece as well. Sheep in general became a key resource for the supply of meat and the animal economy in the Near East, in front of the other domestic species, goat, cattle and pig, whereas products obtained from hunting lost their former importance.

The findings from archaeozoology in Northern Mesopotamia (Northern Iraq and Syria, Northeastern Turkey) indicate that village communities of the late Neolithic Period (Halaf-Ubaid, 6th–5th millennium BC) practiced diversified animal husbandry comprising combinations of sheep, goat, cattle, and pig breeding.⁵ During the Uruk Period, at the end of the 4th millennium (3500–3000 BC, late Chalcolithic), livestock breeding was specialized in the exploitation of caprines (sheep and goat). Taking into account the frequencies of the domestic species, the caprines, mostly sheep, clearly dominate the economy: in 85% of the assemblages of this period, 80% of the domestic fauna are made up of caprines.⁶ Other domestic species were apparently no longer essential in this period, as the evidence for cattle is scanty and that for pigs frequently missing. This specialization in caprine pastoralism occurred in a context of urban expansion and technical innovation (wheel, pictographic writing, etc.) and is most of all perceptible in Northern Mesopotamia. This pastoral system must have been linked with herd mobility and transhumance, particularly in the steppe areas of the region.⁷

2. The average size of the sheep: metrics and meanings

Although measurable bone remains from Near Eastern archaeological sites are unequally distributed and might be scarce, metrical analyses of skeletal remains indicate changes in the average size of sheep between the Late Neolithic and the Iron Age in Mesopotamia as well as in Anatolia and the Levant.⁸ New data from recent archaeozoological studies carried out on Tell Tawila,⁹ Tell Feres,¹⁰ Tell Chuera,¹¹ Kharab Sayyar¹² and Al Rawda¹³ in Syria support the previous observations done on the size of the Halaf, Uruk and Early Bronze Age sheep (Fig. 2.1). The metrical study has been done here on the talus or anklebone (bone of the articulation between the foot and the leg). The talus is often well preserved in archaeological excavation because of its tiny size and compact structure. As there is no epiphyseal fusion on the talus, the state of growth and the cessation of longitudinal growth are not clearly marked. Only the general aspect of the talus helps to determine if the bone has reached its full growth: porous bones are from

animals that have not fully grown up, non-porous ones with smooth surface indicate that they have reached their maximum length. For those reasons, the accuracy of the growth estimation on talus is not guaranteed and depends, amongst other things, on the good preservation of the bone.

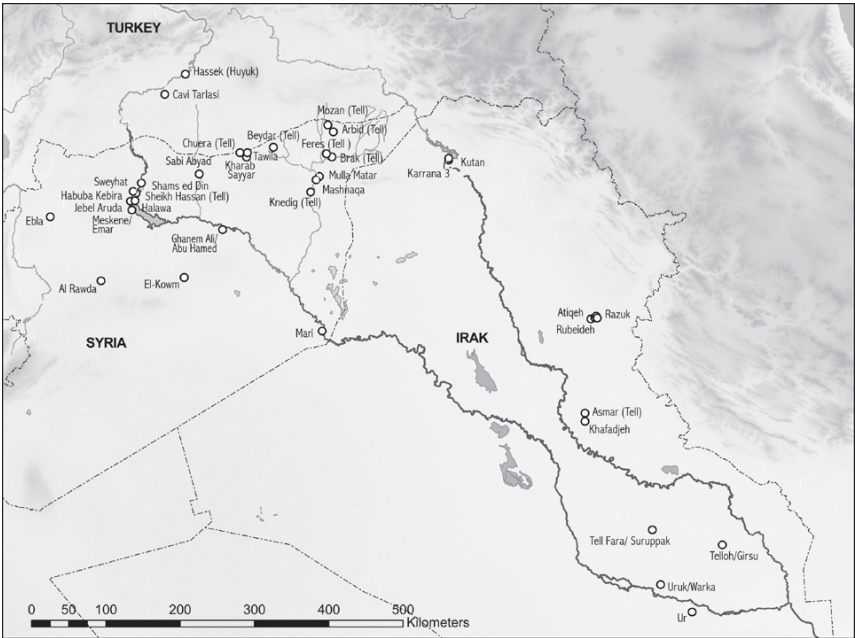


Fig. 2.1. Map of the Near East: Location of the archaeological places cited in the text, tables and figures.

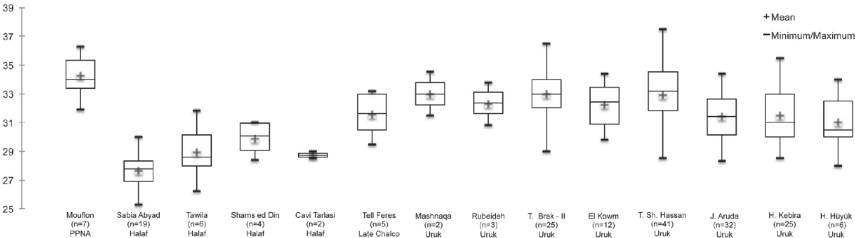


Fig. 2.2. Box plots comparison of the distribution of the greatest length of sheep talus from Halaf and Uruk sites (Computation done with XLSTAT 2013). The box displays the median value and the interquartile range that contains 50% of values.

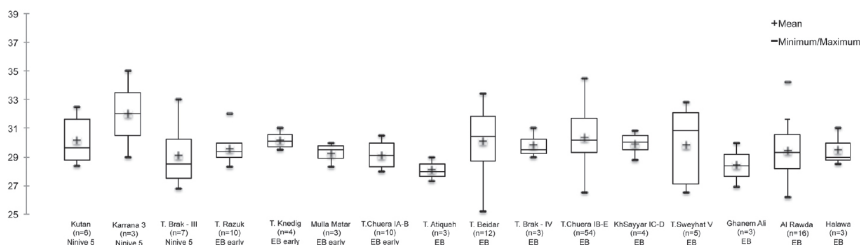


Fig. 2.3. Box plots comparison of the distribution of the greatest length of sheep talus from from Early Bronze Age sites (Computation done with XLSTAT 2013). The box displays the median value and the interquartile range that contains 50% of values.

The analysis of the greatest length (GL) of sheep talus from various assemblages from Syrian sites and some others from Iraqi and Turkish sites discloses size variations among the sheep surveyed between the end of the Neolithic (Halaf period) and the Early Bronze Age, a period ranging from the 5th to the 3rd millennium (Table 2.1).

While Neolithic sheep from Halaf sites are small, the Chalcolithic ones from the Late Chalcolithic and Uruk sites clearly increase in size. This is a common feature observed at all Uruk sites in Northern Syria and Iraq even when the number of specimens is very low (Fig. 2.2). The average size then decreases in the Early Bronze Age. This decrease in size is observable at most contemporary sites in Northern Syria and Iraq, as well as in Turkey (Fig. 2.3).

				N	Minimum	Maximum	Median	Mean	Variance (n)	Stdev	Coefficient of variation	Stdev (mean)	95% lower limit (mean)	95% upper limit (mean)	Stdev (variance)
PPNA	Syria	Wild sheep/mouflon	Helmer unpublished data	7	31.9	36.3	34.00	34.23	2.096	1.448	0.042	0.591	32.782	35.675	1.412
Halaf	Syria	Sabi Abyad	Cavallo 2000	19	25.3	30.0	27.80	27.66	1.279	1.131	0.041	0.267	27.098	28.218	0.450
Halaf	Syria	Tawila	Vila unpublished data	6	26.2	31.8	28.60	28.95	3.326	1.824	0.063	0.816	26.853	31.047	2.524
Halaf	Syria	Shams ed Din	Uerpmann 1982	4	28.4	31.0	30.10	29.90	1.205	1.098	0.037	0.634	27.883	31.917	1.312
Halaf	Turkey	Cavi Tarlasi	Schäffer and Boessneck 1988	2	28.5	29.0	28.75	28.75	0.063	0.250	0.009	0.250	25.573	31.927	0.177
Late Chalc	Syria	Tell Feres	Vila unpublished data	5	29.5	33.2	31.60	31.56	2.026	1.424	0.045	0.712	29.584	33.536	1.791
Uruk	Syria	Mashnaga	Vila unpublished data	2	31.5	34.5	33.00	33.00	2.250	1.500	0.045	1.500	31.941	32.059	6.364
Uruk	Irak	Rubeideh	Payne 1988	3	30.8	33.8	32.40	32.33	1.502	1.226	0.038	0.867	28.604	36.062	2.253
Uruk	Syria	Tell Brak - phase II	Dobney et al. 2003	25	29.0	36.5	33.00	32.96	3.896	1.974	0.060	0.403	32.132	33.796	1.172
Uruk	Syria	El Kowm	Vila 1994, 1998	12	29.8	34.4	32.45	32.23	2.302	1.517	0.047	0.457	31.226	33.240	1.071
Uruk	Syria	T. Sheikh Hassan	Vila 1994, 1998	41	28.5	37.5	33.20	32.93	4.485	2.118	0.064	0.335	32.250	33.604	1.028
Uruk	Syria	Jebel Aruda	Buitenhuis 1988	32	28.3	34.4	31.40	31.43	2.284	1.511	0.048	0.271	30.881	31.988	0.599
Uruk	Syria	Halabula Kebira	Ziegler unpublished data	25	28.5	35.5	31.00	31.49	4.341	2.083	0.066	0.425	30.614	32.370	1.305
Uruk	Turkey	Hasek Hüyük	Stahl 1989	6	28.0	34.0	30.50	31.00	4.000	2.000	0.065	0.894	28.701	33.299	3.036
Nineve 5	Irak	Kutan	Vila 1994, 1998	6	28.4	32.5	29.65	30.15	2.676	1.636	0.054	0.732	28.469	32.031	2.031
Nineve 5	Irak	Karana 3	Boessneck and Driesch 1993	3	29.0	35.0	32.00	32.00	6.000	2.449	0.077	1.732	24.548	39.452	9.000
Nineve 5	Syria	Tell Brak - phase III	Dobney et al. 2003	7	26.8	33.0	28.50	29.11	4.607	2.146	0.074	0.876	26.970	31.259	3.103
EBA early	Irak	Tell Razuk EB I-II	Boessneck 1987	10	28.3	32.0	29.35	29.58	0.926	0.962	0.033	0.321	28.855	30.305	0.485
EBA early	Irak	Tell Knedig	Vila 2005a	4	29.5	31.0	30.10	30.18	0.332	0.576	0.019	0.333	29.117	31.233	0.361
EBA early	Syria	Mulla Matar	Vila 1994, 1998	3	28.3	30.0	29.50	29.27	0.509	0.713	0.024	0.504	27.096	31.437	0.763
EBA early	Syria	Tell Chera and Kharab Sayyar TCH IA-IB	Vila 2010	10	28.0	30.5	29.10	29.13	0.816	0.903	0.031	0.301	28.449	29.811	0.427
EBA	Irak	Tell Atiqeh Akkad 2350-2200	Boessneck 1987	3	27.3	29.0	28.00	28.10	0.487	0.698	0.025	0.493	25.978	30.222	0.730
EBA	Syria	Tell Beidar EB III-IV	Van Neer and De Cupere 2001	12	25.2	33.4	30.45	30.08	6.375	2.525	0.084	0.761	28.399	31.751	2.966
EBA	Syria	Tell Brak - phase IV	Dobney et al. 2003	3	29.0	31.0	29.50	29.83	0.722	0.850	0.028	0.601	27.248	32.419	1.083
EBA	Syria	Tell Chera TCH IB-IE	Vila 1994, 1998, 2010	54	26.50	34.50	30.20	30.36	1.603	1.603	0.053	0.220	29.923	30.806	0.508
EBA	Syria	Kharab Sayyar TCH IC-ID	Vila 2010	4	28.8	30.8	30.05	29.93	0.577	0.760	0.025	0.439	28.529	31.321	0.628
EBA	Syria	Tell es Swayhat V 2400-2200	Buitenhuis 1988	5	26.5	32.8	30.80	29.86	6.690	2.587	0.087	1.293	26.269	33.451	5.914
EBA	Syria	Ghannem Ali EB III-IVA	Vila 2005b	3	26.9	30.0	28.40	28.43	1.602	1.266	0.045	0.895	24.582	32.284	2.403
EBA	Syria	Al Randa EB IV	Vila and Bessio, in print	16	26.2	34.2	29.30	29.47	3.630	1.905	0.065	0.492	28.420	30.517	1.414
EBA	Syria	Halawa EB IV	Boessneck and Kokabi 1981	3	28.5	31.0	29.00	29.50	1.167	1.080	0.037	0.764	26.214	32.786	1.750

Table 2.1. Statistical analysis of the studied assemblages (References in the bibliography).

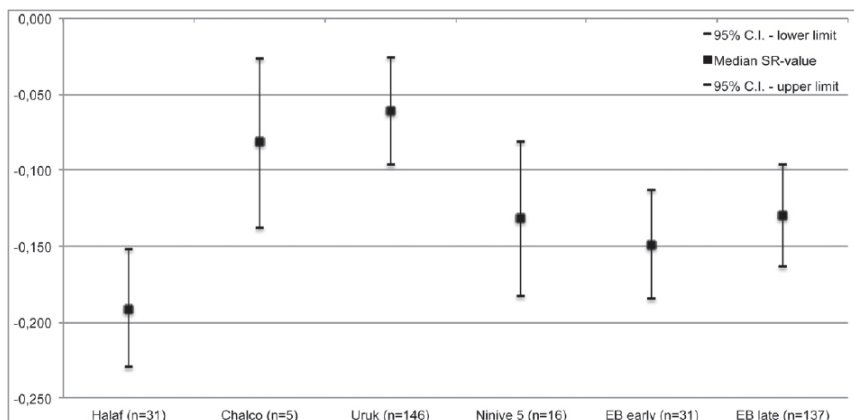


Fig. 2.4. Simpson's Log-ratio confidence intervals on the greatest length measurement of the talus by periods (comparison reference: PPNA mouflon. Computations done on the user-friendly Excel file available with Appendix A, Escarguel 2012).

Estimates of Simpson's Log-ratio¹⁴ confidence intervals using parametric bootstrap¹⁵ has been achieved on the greatest length of talus for each archaeological period, i.e. Halaf, Late Chalcolithic, Uruk and Early Bronze Age. The Early Bronze is divided in two parts: the beginning of the 3rd millennium BC and the middle and late 3rd millennium BC. According to the estimates of Simpson's Log-ratio, the size of the talus clearly rises from the Halaf period, peaks in the Uruk period and decreases in the Early Bronze Age from the Ninive 5 period on (Fig. 2.4). The talus size does not vary significantly during the 3rd millennium BC.

A One-way Analysis of Variance (ANOVA) has been done in order to compare the Uruk period and Early Bronze Age talus bone assemblages (Table 2.2). According to the results, the Uruk and the Early Bronze Age samples do not share a single Simpson's Log-ratio value. The analysis shows that the sheep from the Uruk period and from the Early Bronze Age are significantly different in size according to the talus bone measurement.

Considering all measurements of the greatest length of the talus from the Uruk period, the mean is 32.2 mm, while in the Early Bronze Age, it is 30 mm. Based on the multiplication factors of Teichert,¹⁶ the withers height average of the Uruk sheep is 73 cm¹⁷ and that of the Early Bronze Age sheep is 68 cm.

It is difficult to understand the causes of such size variations. Change in mean size of a species over time can, besides domestication, be attributed to different factors such as climatic changes,¹⁸ pasture quality¹⁹ and nutritional stress.²⁰ The size of other small ungulates like the gazelle and the domestic goat does not present any variation during the Late Chalcolithic and the Early Bronze Age.²¹ Therefore, the variations of the sheep size at these periods are not linked to environmental and climatic changes. According to a recent study, the greatest length of the talus in sheep is not significantly affected by nutrition conditions unlike other skeletal elements,²² so that the size variation observed on this bone cannot be related to variation in nutritional conditions.

Sample	Sample name	Nb. of specimens	Bootstrapped mean SR	Bootstrapped variance SR
1	Early Bronze	137	-0,130	0,04025
2	Uruk	146	-0,061	0,04723

BARTLETT'S TEST for homogeneity of variances

ANOVA	B	d.f.	p	Proportion of variance explained
	0,8913	1	0,3451	
	Number of studied samples	Number of studied specimens	Grand mean	
	k	N	M	
	2	283	-0,094	0,023

ANOVA table

Source	S.S.	d.f.	M.S.	F
Between samples	0,334	1	0,3337	7,610
Within samples	12,323	281	0,0439	
Total	12,656	282	0,0449	
Significance (F)	p=	0,00618	6,2E-03	

Table 2.2. One-way Analysis of Variance (ANOVA) to compare the Uruk period and Early Bronze

Age talus bones assemblages (greatest length – comparison reference: PPNA mouflon). Equal-variance ANOVA (F-statistic) and effect-size 2-statistics are computed, based, on the size (number of measured specimens) and bootstrapped SR-mean and variance of k (Computations done on the user-friendly Excel file available with the Appendix A, Escarguel 2012).

However, size estimates can also be affected by the sex ratio in the sample studied. As the size of the talus does not seem to be affected significantly by castration,²³ the large size of the Uruk sheep may not be connected to this practice. To take a closer look at the male/female sex ratio and its possible influence on the mean size of sheep, we used the Mixture Analysis routine implemented in PAST.²⁴ This statistical method was applied to the distal breadth (BD) measurement from three talus bone assemblages, one from the Uruk period (Tell Sheikh Hassan), two from the Early Bronze Age (Tell Chuera: EJ II–III – Al Rawda: EBIV), in order to define the sub-groups related to sexual dimorphism making up the various samples and their respective proportions for each site.

First of all, a statistical analysis concerning the distribution of those samples has been undertaken. It turns out that from each site there is an astragal of exceptionally large size, reaching more than 2 standard deviations at Tell Sheikh Hassan and 2.6 standard deviations at Rawda and Tell Chuera (Table 2.1) – meaning that there is a possibility of 90 out of 100 at Tell Sheikh Hassan and of 99 out of 100 at the other two sites that those bones do not belong to the population under study. With ovines, such measurements correspond to those of male mouflons. These big bones have been eliminated from the study below.

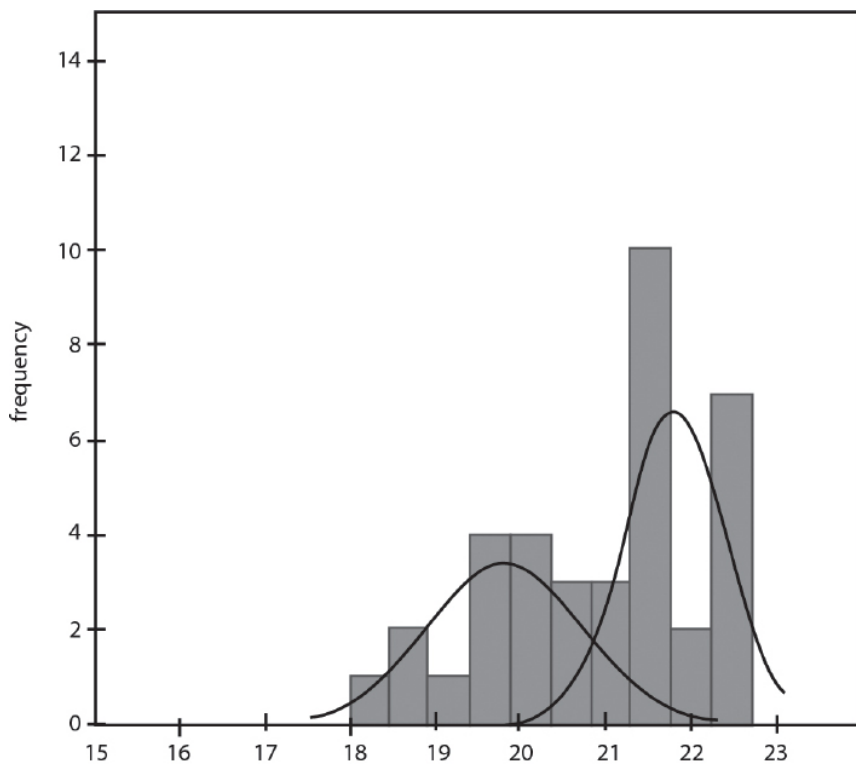


Fig. 2.5. Tell Sheikh Hassan, Uruk Period: Mixture analysis of the talus distal breadth measurement (BD – N = 37) with a bimodal distribution.

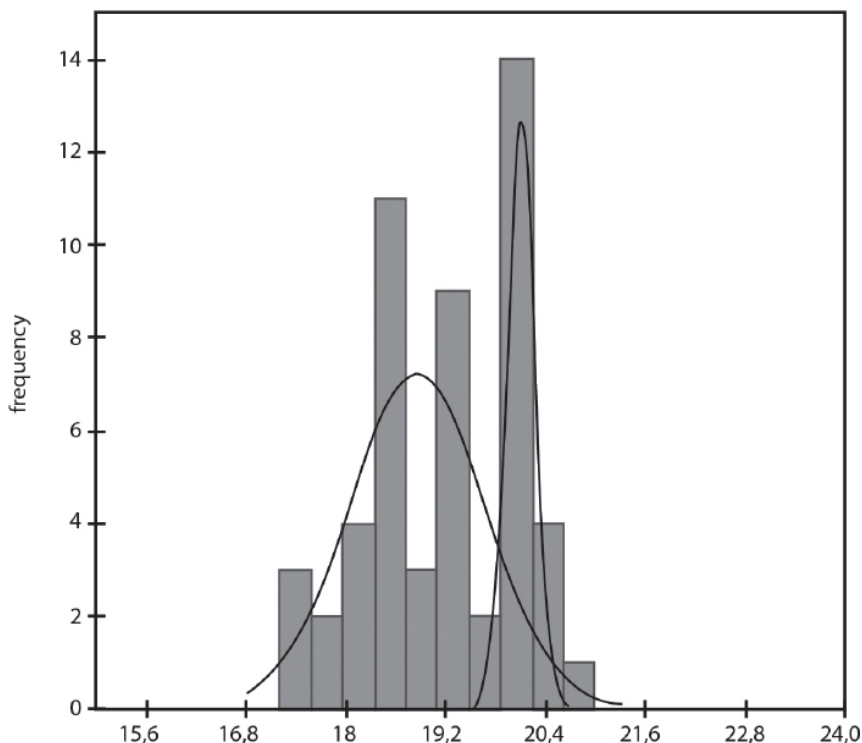


Fig. 2.6. Tell Chuera, Early Bronze Age (EJ II–III): Mixture analysis of the talus distal breadth measurement (BD – N = 53) with a bimodal distribution.

The Mixture on Tell Sheikh Hassan talus bones for the Uruk period presents a bimodal distribution (Fig. 2.5). Assuming the two modes represent the clusters of males and females from the sample, therefore, the smaller mode represents the females (mean = 19.8) and the larger one (mean = 21.83) should represent the males. The mixing proportion is 0.484 to 0.515, which would indicate 48% females and 51% males are in the sample. The high number of males is surprising and may reflect that the males were kept for the fleece. The possibility of the presence of mouflon cannot be completely rejected nor can that of small-sized sheep.

The Mixture analysis done on Tell Chuera talus bones for the Early Bronze Age (EJ II–III) also shows a bimodal distribution (Fig. 2.6). The smaller mode (mean = 18.84) certainly represents the females and the larger one (mean = 20.09) should represent the males. The mixing proportion is 0.260 to 0.733, which would indicate 26% males and 73.3% females are in the sample. The proportion males/females fits well with a management of the herd primarily for meat and milk production.

The Mixture analysis done on Al Rawda talus bones for the Early Bronze Age (EB IV) also shows a bimodal distribution (Fig. 2.7). Here again the smaller mode (mean = 17.25) represents the females and the larger one (mean = 19.29) the males. The mixing proportion is 0.36 to 0.64, which would indicate 36% females

and 64% males are in the sample. This male/female sex ratio is particular and suggests a management of the herd for the fleece, however the presence of a mixture of different-sized sheep could also partly explain this distribution.

According to the Mixture analysis done on these three assemblages, the size difference observed from the metrical analysis between the Uruk period and the Early Bronze Age is not related to relative proportions of sex ratio and sexual dimorphism. In fact, the bimodal distributions indicate that in each assemblage female and male are present and that the Tell Sheikh Hassan Uruk males are larger than the Tell Chuera and Al Rawda Early Bronze Age ones. The same applies to females, Tell Sheikh Hassan females are larger than Tell Chuera and Al Rawda ones.

In sum, the sheep of the Uruk period and those of the Early Bronze Age have a distinctive size both for males and females that is not related, as already mentioned, to climate and environment²⁵ or nutrition²⁶ nor to imbalance in the sex-ratio (i.e. absence of males).

The possible existence of different sheep types (or breeds) may be an explanation for the distinctive size which has been highlighted in the osteo-metric analysis. The study of the iconographic sources provides some insight into the characteristic of the sheep of Uruk and Bronze Age periods and presents in fact two main types of sheep.

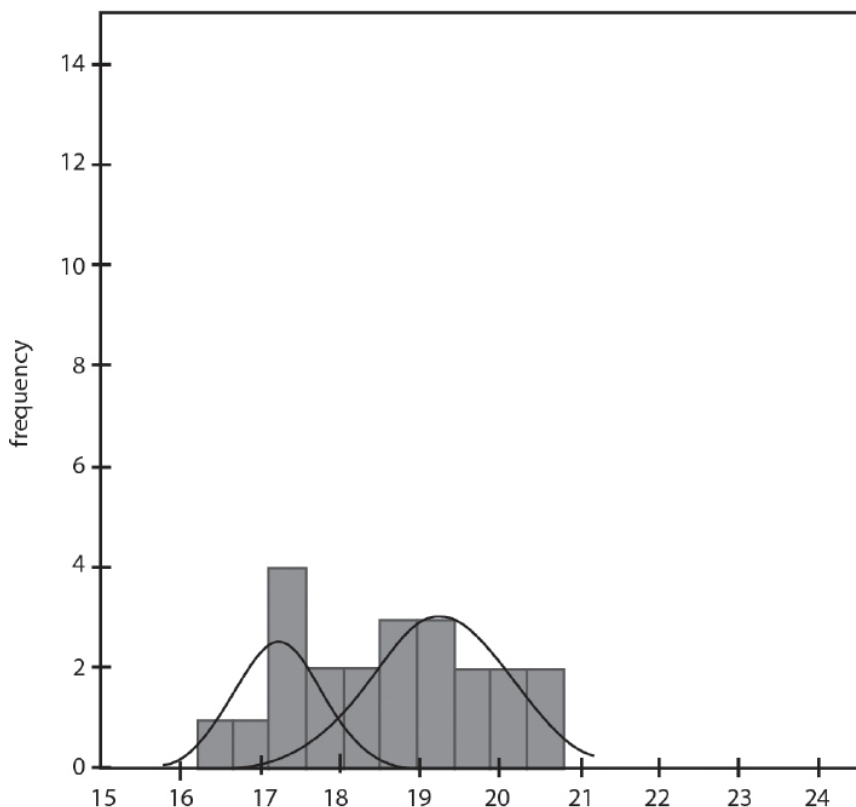


Fig. 2.7. Rawda, Early Bronze Age (EBIV): Mixture analysis of the talus distal breadth measurement (BD – N = 23) with a bimodal distribution.

3. The iconography of the sheep in the ancient Orient

Representations of small ungulates in the ancient Orient are often difficult to identify specifically. To distinguish between sheep, goat and gazelle, the different elements taken into account are the shape of the horn (straight and backward for goat and gazelle, curled for sheep), the presence of a beard (goat) or of a mane (sheep), the position of the tail (goat's tail often stands up, gazelle's and sheep's hang down), the general shape of the body (slender for goat and gazelle, tubbier for sheep) and the presence or absence of a fleece typical of sheep. Despite this, the identification remains sometimes uncertain or is simply impossible. Sheep representations are more or less frequent among the periods. They are often not realistic enough to differentiate between wild and domestic sheep and to provide accurate information about the physical characteristics of the animal that would allow distinguishing between types or breeds. Nevertheless they are useful for their contribution to the present subject. In fact, the analysis of the iconography suggests that the metrics observation done on the talus bones may reflect the presence of different types of sheep, which seem to be attested in the pictorial sources.²⁷ Representations of sheep in the Late Chalcolithic iconography, i.e. the Uruk period, are mostly known from three main sources: clay sealings impressed with stamp seals, figurines and stone vessels. They most often display rams with long spiral (or corkscrew) horns spread horizontally. The ewes are polled (Figs 2.8, 2.9, 2.10 and 2.11). This sheep breed seems to have hairy coats, but no woolly fleece. A sheep breed with spiral horns spread horizontally is known in the Egyptian iconography from the end of the 4th millennium onwards (Fig. 2.12). According to naturalistic representations of this type from tomb paintings and papyrus drawings,²⁸ ewes are horned, the tail is long and thin and the coat is hairy. The colour of the coat is light brown or dark brown, sometimes with dark spots. The legs are long. Sheep with external features, i.e. horizontal spiral horns and hairy coat, similar to those of the ancient Mesopotamian and Egyptian breeds can still be found today in some parts of Western Africa.²⁹



Fig. 2.8. Habuba Kebira, Uruk period. Clay sealings impressed with stamp seals. Herd composed of ewes, rams with spiral horns and lambs (after Rova 1994, no. 49).



Fig. 2.9. Habuba Kebira, Uruk period. Clay sealings impressed with stamp seals. Herd composed of ewes, rams with spiral horns and lambs (after Rova 1994, no. 60).

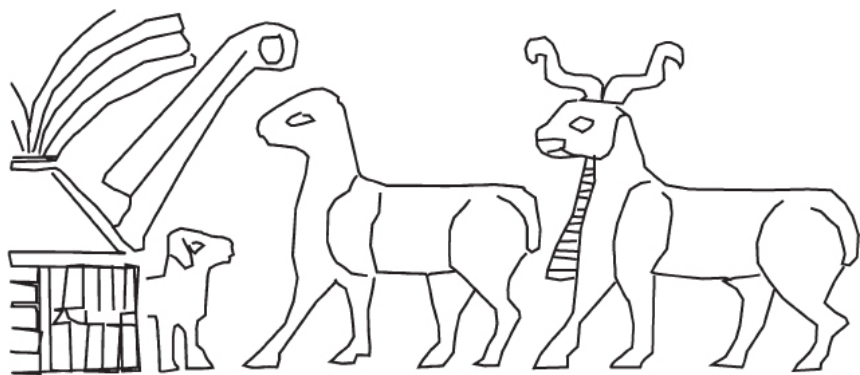


Fig. 2.10. Uruk-Warka, Uruk period. Stone trough with a carved side: schematic representation of the frieze with a ewe, a ram and a lamb emerging from a hut (after Delougaz 1968, fig. 5). The ram has spiral horns and a mane.

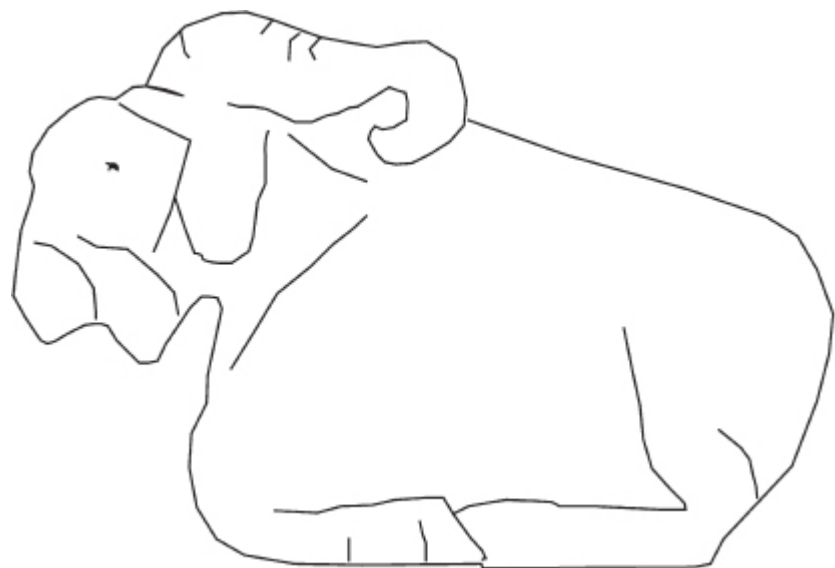


Fig. 2.11. Uruk-Warka, Uruk period. Sketch of a caprines figurine: Maybe a ram with spiral horns (after Heinrich 1936, Tafel 12g, identified as a goat by the author).

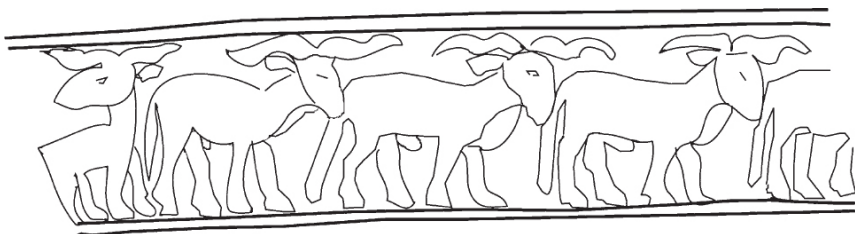


Fig. 2.12. Abydos, Predynastic Period (c. 3100 BC). Sketch of the rams frieze on the third register of the Libyen Palette (Kairo Museum, Duerst and Gaillard 1902, fig. 1). The rams have horizontal spiral horns, long tails and manes.



Fig. 2.13. Uruk-Warka, Uruk period. Sketch of a figurine fragment: Ram with coiled horns (after Heinrich 1936, Tafel 4b).

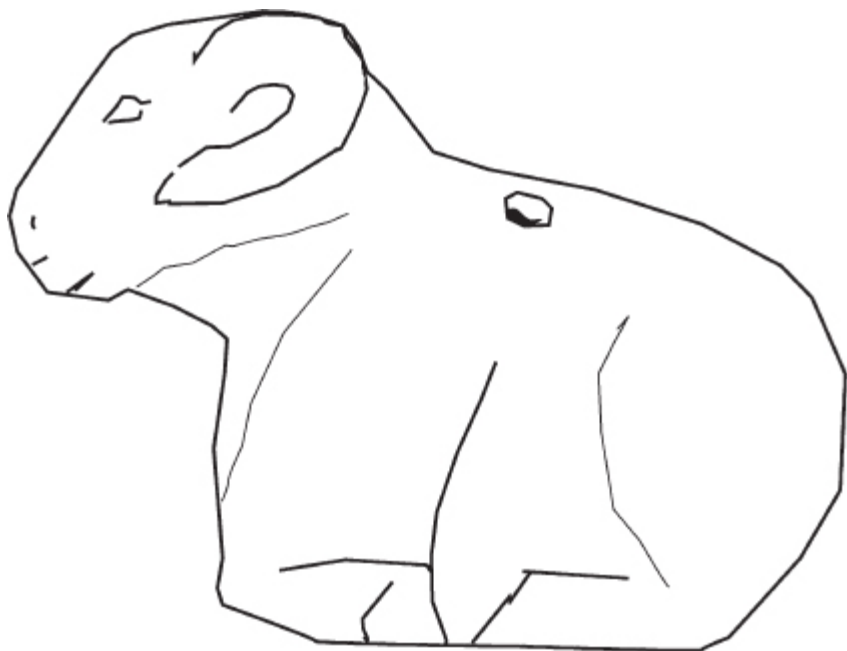


Fig. 2.14. Uruk-Warka, Uruk period. Sketch of an amulet: Ram with coiled horns (after Heinrich 1936, Tafel 9a).



Fig. 2.15. Uruk-Warka, Uruk period. Schematic representation of a cylinder seal (on the top a ram with coiled horns) and its print: rams with spiral horns and mane (after Rova 1994, no. 782; Heinrich 1936, Tafel 16a).



Fig. 2.16. Tepe Gawra, Uruk period. Clay sealing with caprines. Upper part: a ram with spiral horns and a ewe?; lower part: a goat? and a ram with coiled horns? (Rothman 2002, pl. 57–2991).

Representations, i.e. figurines, from the Near Eastern Chalcolithic Period also show sheep with coiled horns (Figs 2.13 and 2.14).³⁰ A cylinder seal from Uruk-Warka even depicts both types: the figurine represents a coiled-horn sheep, whereas the impression reveals a sheep with spiral horns (Fig. 2.15). Possibly the two types appear also on a clay sealing from Tepe Gawra (Fig. 2.16). Furthermore, evidence for the fat-tailed variety is also attested to for the first time towards the end of the 4th millennium BC³¹.

As for the Early Bronze Age, Northern Mesopotamian iconography has merely one representation of a sheep with coiled horns and a primitive fleece of an average fineness (Fig. 2.17). Fleece can be indicated on sheep figurines by incised lines (Figs 2.18, 2.19 and 2.20).³² Otherwise, there is very rarely evidence for spiral-horned sheep after the Uruk period. A representation of such a type appears on the Middle Bronze Age stone libation-basin from Temple D in Ebla (Fig. 2.2133).³⁴ In Egypt, there are numerous representations of sheep with spiral (corkscrew) horns, hairy coats and thin tails for the 2nd millennium, in some cases in association with depictions of sheep with coiled horns (Fig. 2.22). Both types also appear in the Egyptian pantheon (with the gods Khnum and Amon).

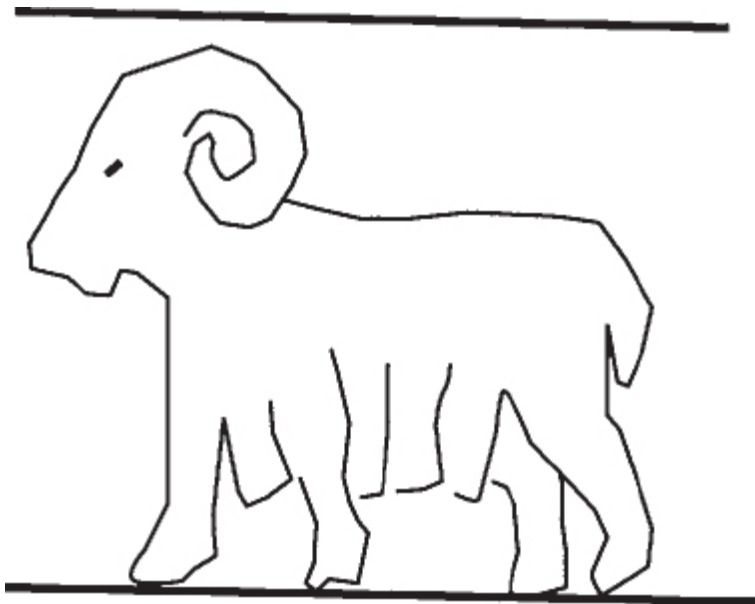


Fig. 2.17. Tell Mozan, end of the 3rd millennium BC. Detail of a seal: ram with coiled horns and woolly coat (after Buccellati and Kelly Buccellati 1995–1996, fig. 4b).



Fig. 2.18. A sheep figurine from EBA Tell Brak (after Oates et al. 2001, 595, fig. 68).



Fig. 2.19. A ram figurine from EBA Tell Arbid (after Piatkowska-Malecka and Smogorzewska 2010, 38, fig. 6).

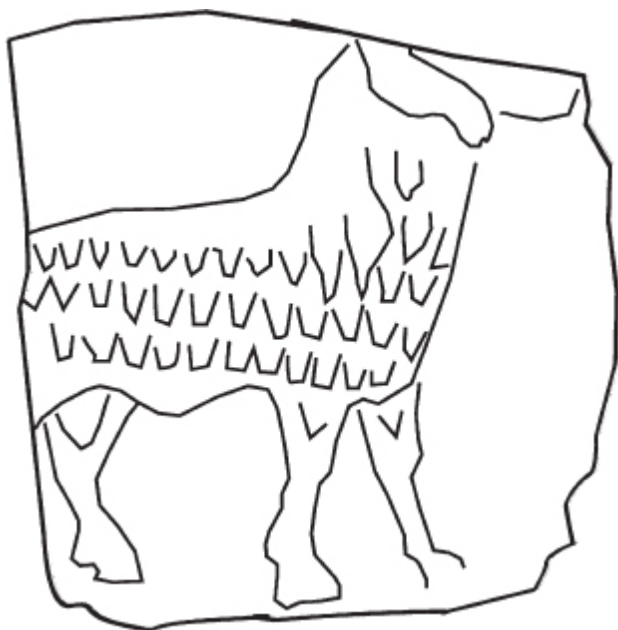


Fig. 2.20. Telloh, Ur III period. Schematic representation on a fragment of a decorated plaque (De Genouillac 1936, pl. 108–2c).

According to the osteometry and the iconography, two sheep varieties with potentially diverging exploitation purposes are therefore already known in the Near East from the Chalcolithic Period.

The large sheep of the Late Chalcolithic/Uruk period might correspond with the iconographical type with horizontal spiral horns and a hairy coat.³⁵ The smaller sheep of the Early Bronze Age might correspond to the sheep with coiled horns and a woolly coat. The breeding of the large variety was probably given favour during the expansion of the Uruk culture, which from a particularly arid region in Southern Mesopotamia exerted an extraordinarily strong influence on northern and eastern regions of the Near East. Today, most hairy sheep varieties are found in the dry zones of West Africa. The West African long-legged sheep has exterior characteristics similar to those of the 4th millennium Mesopotamian and the 2nd millennium Egyptian types and is considered hardy and well adapted to the arid environment.

The persistence of this type, which is traditionally bred by nomadic pastoralists, is undoubtedly connected to its adaptation to a specific environment. Indeed, natural selection remains a determinant factor in acclimatizing processes of domesticated species outside their natural habitat as well as in the appearance and maintenance of native varieties shaped by climate, environment, food availability, and perimeter of mobility.

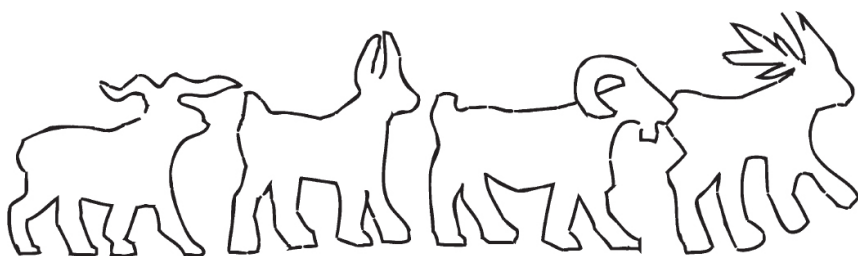


Fig. 2.21. Ebla, Middle Bronze Age. Sketch of the animal's frieze on the ritual limestone basin Temple D. The last animal at the left has horizontal spiral horns and can be identified as a sheep (after Castellino et al. 1966, Tav. XLIV).



Fig. 2.22. Beni Hassan, Tomb no. 3, XIIIth dynasty, Middle Bronze Age – Two types of sheep: one with spiral horns and the other one with coiled horns (after Newberry 1893, plate XXX).

Increasing urbanization generates new requirements and the necessity for large-

scale production. Such factors have also affected wool production and would have led to the preference of smaller varieties with coiled horns, fat tails and woolly fleeces, though the question about their origins – whether local or foreign – yet remains to be answered.

In conclusion, the archaeozoological data that attest the specialization in sheep breeding and a predominant exploitation of a small-sized sheep in Northern Mesopotamia, as well as the iconographical data seem to indicate that the 3rd millennium formed a key period in the development of a woolly breed and production of wool. From this period onwards, the predilection for exploiting fleece-generating sheep seems clearly established. Probably from that time on, wool production develops into an elaborated economic sector, involving the breeding and selection of varieties in anticipation of producing wool fibres. Further research is needed on morphometric analyses of sheep bones from Chalcolithic and Bronze Age archaeological sites in order to try to distinguish the varieties and to track the origins and the trade ways of the different types of sheep, specially the woolly one. Advances in statistical analysis of form like the geometric morphometrics, that has not yet been applied to sheep bones, could provides new informations on such topics.

Bibliography

- Acharya, R. M. (1982) *Sheep and Goat Breeds of India*. FAO Animal Production and Health Paper 30. Rome.
- Becker, J., Helms, T., Posselt, M. and Vila, E. (2007) Ausgrabungen in Tell Tawila, Nordost-Syrien, Bericht über zwei Grabungskampagnen 2005 und 2006. *Mitteilungen der Deutschen Orient-Gesellschaft zu Berlin* 139, 205–260.
- Boessneck, J. (1987) Tierknochen aus Uch Tepe. *Acta Praehistorica et Archaeologica* 19, 131–163.
- Boessneck, J., von den Driesch, A. and Ziegler, R. (1989) Die Tierreste von Maadi und dem Friedhof am Wadi Digla. In I. Rizkana and J. Seeher (eds), *Maadi III. The Non-Lithic Small Finds and the Structural Remains of the Predynastic Settlement*, 87–128. Mainz am Rhein
- Boessneck, J. and Driesch von den, A. (1993) Die Faunenreste. In G. Wilhelm and C. Zaccagnini (eds), *Tell Karana 3*, Tell Gikan, Tell Khirbet Salik. *Baghdader Forschungen* 15, 233–236. Mainz.
- Boessneck, J. and Kokabi, M. (1981) Tierknochenfunde. In W. Orthmann (ed.), *Halawa 1977–1979: vorläufiger Bericht über die 1. bis 3. Grabungskampagne*. *Saarbrücker Beiträge zur Altertumskunde* 31, 89–104.
- Boessneck, J., Müller, H.-H. and Teichert, M. (1964) Osteologische Unterscheidungsmerkmale zwischen Schaf (*Ovis aries* L.) und Ziege (*Capra hircus* L.). *Kühn Archiv* 78, 1–129.
- Buccellati, G. and Kelly-Buccellati, M. (1995–6) The Royal Storehouse of Urkesh: the Glyptic Evidence from the Southwestern Wing. *Archiv für Orientforschung* 42/43, 1–32.
- Buitenhuis, H. (1988) *Archeozoologisch Onderzoek langs de Midden-Eufraat*. PhD Wiskunde en Natuurwetenschappen aan de Rijksuniversiteit Groningen, Groningen.
- Castellino, G., Cecchini, S. M., Davico, A., Squarciapino, M. F., Fronzaroli, P., Liverani, M., Matthiae, P. and Matthiae Scandone G. (1966) *Missione archeologica italiana in Siria: rapporto preliminare della campagna 1965 (Tell Mardikh)*. Roma.
- Cavallo, C. (2000) *Animals in the Steppe. A Zooarchaeological Analysis of Later Neolithic Tell Sabi Abyad, Syria*. Oxford.
- Davis, S. J. M. (1987) *The Archaeology of Animals*. London.
- Davis, S. J. M. (1996) Measurements of a Group of Adult Female Shetland Sheep Skeletons from a Single Flock: A Baseline for Zooarchaeologists. *Journal of Archaeological Science* 23, 593–612.
- Delougaz, P. P. (1968) Animals Emerging from a Hut. *Journal of Near Eastern Studies* 27, 186–197.
- Dobney, K., Jaques, D. and Van Neer, W. (2003) Diet, Economy and Status: Evidence from the Animal Bones. In R. Matthews (ed.), *Excavations at Tell Brak vol. 4. Exploring a Regional Centre in Upper Mesopotamia, 1994–1996*. McDonald Institute and British School of Archaeology in

- Iraq, 417–430. Cambridge.
- Driesch von den, A. (1976) *A Guide to the Measurement of Animal Bones from Archaeological Sites*. Peabody Museum Bulletin 1. Cambridge.
- Duerst, J. U. and Gaillard, C. (1902) Studien über die Geschichte des ägyptischen Hausschafe. In G. Maspero (ed.), *Recueil de travaux relatifs à la philologie et à l'archéologie égyptienne et assyrienne*, 199–212. Paris.
- Epstein, H. and Mason, I. L. (1971) *The Origin of the Domestic Animals of Africa*. New York-London-Munich.
- Escarguel, G. (2012) Appendix A. Statistical Analysis of Simpson's Log-ratios. In P. Missiaen, G. Escarguel, J.-L. Hartenberger and T. Smith, A Large New Collection of Palaeostylops from the Paleocene of the Flaming Cliffs Area (Ulan-Nur Basin, Gobi Desert, Mongolia), and an Evaluation of the Phylogenetic Affinities of Arctostylopidae (Mammalia, Gliriformes). *Geobios* 45/3, 311–322. Supplementary materials, 1–24.
- Frankfort, H. (1955) *Stratified Cylinder Seals from the Diyala Region*. Oriental Institute Publication LXXII. Chicago.
- Genouillac Abbé H. de (1936) *Fouilles de Telloh II: Epoques d'Ur III Dynastie et de Larsa*. Paris.
- Gillis, R., Chaix, L. and Vigne, J.-D. (2011) An Assessment of Morphological Criteria for Discriminating Sheep and Goat Mandibles on a Large Prehistoric Archaeological Assemblage (Kerma, Sudan). *Journal of Archaeological Science* 38, 2324–2339.
- Halstead, P., Collins, P. and Isaakidou, V. (2002) Sorting the Sheep from the Goats: Morphological Distinction between the Mandibles and Mandibular Teeth of Adult *Ovis* and *Capra*. *Journal of Archaeological Science* 29, 545–553.
- Hammer, Ø, Harper, D.A.T. and Ryan, P.D. (2001) PAST: Paleontological Statistics Software Package for Education and Data Analysis. *Palaeontologia Electronica* 4, 1–9.
- Heinrich, E. (1936) *Kleinfunde aus den archaischen Tempelschichten in Uruk, Ausgrabungen der deutschen Forschungsgemeinschaft in Uruk-Warka*. Berlin/Leipzig.
- Helmer, D. (1992) *La domestication des animaux par les hommes préhistoriques*. Paris.
- Helmer, D. (2000) Discrimination des genres *Ovis* et *Capra* à l'aide des prémolaires inférieures 3 et 4 et interprétation des âges d'abattage: l'exemple de Dikili Tash (Grèce), *Ibex*. *Journal of Mountain Ecology/Anthropozoologica* 5/31, 29–38.
- Helmer, D., Gourichon, L. and Vila, E. (2007) The Development of the Exploitation of Products from *Capra* and *Ovis* (Meat, Milk and Fleece) From the PPNB to the Early Bronze in the Northern Near East (8700 to 2000 BC cal.). *Anthropozoologica* 42, 41–69.
- Hilzheimer, M. (1936) Zoologische Bemerkungen zu den Tierdarstellungen. In E. Heinrich, *Kleinfunde aus den archaischen Tempelschichten in Uruk, Ausgrabungen der deutschen Forschungsgemeinschaft in Uruk-Warka*, 46–54. Berlin/Leipzig.
- Hilzheimer, M. (1941) *Animal remains from Tell Asmar*, Chicago.
- Kamalzadeh, A., Koops, W. J., Van Bruchem, J. and Bangma, G. A. (1998) Effect of Duration of Feed Quality Restriction on Body Dimensions in Lambs. *Journal of Animal Science* 76, 735–742.
- Kokabi, M. (1980) Tierknochenfunde aus Giseh/Ägypten. *Annalen des Naturhistorischen Museums in Wien* 83, 519–537.
- Martin, H. P. (1988) *Fara: A Reconstruction of the Ancient Mesopotamian City of Shuruppak*. Birmingham.
- Meiri, S., Dayan, T. and Simberloff, D. (2005), Area, Isolation and Body Size Evolution in Insular Carnivores. *Ecology Letters* 8, 1211–1217. doi: 10.1111/j.1461-0248.2005.00825.x.
- Newberry, P. E. (1893) *Beni Hassan, part I. Archaeological Survey of Egypt*. London.
- Oates, D., Oates, J. and McDonald, H. (2001) *Excavations at Tell Brak, Vol. 2, Nagar in the Third Millennium BC*. Londres and Cambridge.
- Payne, S. (1985) Morphological Distinction between the Mandibular Teeth of Young Sheep, *Ovis*, and Goats, *Capra*. *Journal of Archaeological Science* 12, 139–147.
- Payne, S. (1988) Animal bones From Tell Rubeidheh. In R. G. Killick (ed.), *Tell Rubeidheh. An Uruk Village in the Jebel Hamrin*. Hamrin Salvage Project Report 7, 98–135. Baghdad.
- Peters, J., von den Driesch, A. and Helmer, D. (2005) *The Upper Euphrates-Tigris Basin: Cradle of Agropastoralism?* In J. D. Vigne, J. Peters and D. Helmer (eds), *First Steps of Animal Domestication. New Archaeozoological Approaches*, 96–124. Oxford.
- Piatkowska-Malecka, J. and Smogorzewska A. (2010) Animal Economy at Tell Arbid, North-East Syria, in the Third Millennium BC. *Bioarchaeology of the Near-East* 4, 25–43.

- Popkin, P. R. W., Baker, P., Worley, F., Payne, S. and Hammon, A. (2012) The Sheep Project (1): Determining Skeletal Growth, Timing of Epiphyseal Fusion and Morphometric Variation in Unimproved Shetland Sheep of known Age, Sex, Castration Status and Nutrition. *Journal of Archaeological Science* 39:6, 1775–1792.
- Prummel, W. and Frisch, H.-J. (1986) A Guide for the distinction of species, sex and body side in bones of sheep and goat. *Journal of Archaeological Science* 13, 567–577.
- Rothman, M. S. (2002) *Tepe Gawra. The Evolution of a Small, Prehistoric Center in Northern Iraq*. Philadelphia.
- Rova, E. (1994) *Ricerche sui sigilli a cilindro vicino-orientali del periodo di Uruk/Jemdet Nasr. Orientis Antiqui Collectio 20*. Rome.
- Schäffer, J. and Boessneck J. (1988), Bericht über die Tierreste aus der Halafzeitlichen Siedlung Cavi Tarlasi (Nisibin/Osttürkei). *Istanbuler Mitteilungen* 38, 37–62.
- Searle, T. W., Mc Graham, N. and Donnelly, J. B. (1989) Change of Skeletal Dimensions During Growth in Sheep, the Effect of Nutrition. *Journal of Agricultural Science* 113, 321–327.
- Simpson, G. G. (1941) Explanation of Ratio Diagrams. In G. G. Simpson (ed.), *Large Pleistocene felines of North America. American Museum Novitates* 1136, 1–27.
- Stahl, U. (1989) *Tierknochenfunde vom Hassek Höyük (Südostanatolien)*. PhD, Institut für Palaeoanatomie, Domesticationsforschung und Geschichte der Tiermedizin. Munich.
- Strommenger, E. (1980), *Habuba Kebira, eine Stadt vor 5000 Jahren. Ausgrabungen der Deutschen Orient-Gesellschaft am Euphrat in Habuba Kabira, Syrien*. Mainz am Rhein.
- Teichert, M. (1975) Osteometrische Untersuchungen zur Berechnung der Widerristhöhe bei Schafen. In A. T. Clason (ed.), *Archaeozoological Studies*, 51–59. Amsterdam.
- Trevor Wilson, R. (1991) *Small Ruminant Production and the Small Ruminant Genetic Resource in Tropical Africa*. FAO Animal production and Health paper 88. Rome.
- Uerpmann, H.-P. (1982) Faunal Remains from Shams ed-Din Tannira, a Halafian Site in Northern Syria. *Berytus* 30, 3–52.
- Van Buren, E. D. (1939) *The Fauna of Ancient Mesopotamia as Represented in Art*. *Analecta Orientalia* 18. Rome.
- Van Neer, W. and De Cupere, B. (2000) Faunal Remains From Tell Beydar (Seasons 1992–1997). In K. Van Lerberghe and G. Voet (eds), *Tell Beydar. Environmental and Technical Studies*. Subartu VI, Brepols, 69–116. Turnhout.
- Vila, E. (1994) *L'exploitation des animaux en Mésopotamie au IV^{ème} et III^{ème} millénaires avant J.-C.*, Thèse de doctorat, Paris I-Sorbonne (Part 2: Measurements).
- Vila, E. (1998) *L'exploitation des animaux en Mésopotamie au IV^{ème} et III^{ème} millénaires avant J.-C.*, Monographies du C. R. A. 21. CNRS-éditions.
- Vila, E. (2002) L'évolution de la taille du mouton dans le nord de la Mésopotamie: les faits et leurs causes. In L. Bodson (ed.), *D'os, d'image et de mots. Contribution à la réflexion sur les sources de l'histoire des connaissances zoologiques*, 47–79. Colloques d'histoire des connaissances zoologiques 13. Liège.
- Vila, E. (2005a) Fauna. In E. Klengel-Brandt, S. Kuleman-Ossen and L. Martin (eds), *Tall Knedig, Die Ergebnisse der Ausgrabungen des Vorderasiatischen Museums Berlin in Nordost-Syrien von 1993 bis 1998*, 185–204. Berlin.
- Vila, E. (2005b) Réflexions sur les offrandes animales dans des tombes de la nécropole de Abu Hamad sur les piémonts du Bischri (Syrie, 3^e millénaire av. J.-C., Bronze ancien). In C. Falb, K. Kraznik, J.-W. Meyer and E. Vila, *Der Friedhof von Abu Hamed (Syrien). Gräber des 3. Jahrtausends v. Chr. Im syrischen Euphrattal 4*, Saarländische Druckerei und Verlag, 335–357. Saarwellingen.
- Vila, E. (2006) Données archéozoologiques de la période Halaf à l'Âge du Fer. In B. Lion and C. Michel (eds), *De la domestication au tabou: Le cas des suidés au Proche-Orient ancien*, 137–153. Paris.
- Vila, E. (2010) Etude de la faune mammalienne de Tell Chuera, secteur H et K (2000–2007) et de Kharab-Sayar, secteur A (Bronze ancien, Syrie). In J.-W. Meyer (ed.), *Tell Chuera: Vorbericht zu den Grabungskampagnen 1998 bis 2005*. Vorderasiatische Forschungen der Max Freiherr von Oppenheim-Stiftung 2, II. 223–291. Wiesbaden.
- Vila, E. and Al Besso, M. (in print) L'homme et la steppe au Bronze ancien IV – Etude archéozoologique. In C. Castel, O. Barge, N. Awad and M. Al Maqdisi (ed.), *Des villes neuves aux marges du désert de Syrie à la fin du 3^e millénaire. Travaux de la mission archéologique franco-*

syrienne d'Al-Rawda 2002–2008, *Travaux des missions syriennes de Tell Sha'irat 2007–2008 et Tell Es-Sour 2009*. Publications de la Maison de l'Orient et de la Méditerranée, Lyon.

Woolley, C. L. (1934) *Ur Excavations II, The Royal Cemetery*. Oxford.

Zeuner, F. E. (1963) *A History of Domesticated Animals*. London.

Ziegler, R. (unpublished manuscript) *Tierknochenfunde aus der Mitte des 4. Jahrtausends v. Chr. Von Habuba Kebira-Süd (Nordsyrien)*.

Annexe: Talus measurements

(following Von den Driesch 1976)

Site	Location	GLI	GLm	BD	LI
Tell Tawila	B103	28	26	18.2	15.8
Tell Tawila	B43	26.2	24.5	17.5	15
Tell Tawila	B136	29.2	27.6	20.2	16.8
Tell Tawila	B103	30.5	29	19.5	16.3
Tell Tawila	B113	31.8	30.3	20.2	17.8
Tell Tawila	B8	/	25.5	17.3	15.5
Tell Tawila	B8	28	/	17	15.5
Tell Feres	232	33.2	30.8	19.6	18.2
Tell Feres	300/301	30.5	27.9	21.4	16.6
Tell Feres	310	29.5	28	18.5	16.8
Tell Feres	310	31.6	29.8	20.2	17.2
Tell Feres	99	33	/	21.1	18.3
Mashnaqa	786	31.5	30	19.2	18.5
Mashnaqa	1511	34.5	32.2	19.5	19.8
El Kowm	N87 A3a	32.2	28.4	20.7	
El Kowm	I92 A4	30.2		20.6	
El Kowm	P79	33.7	33.2	20.2	19.1
El Kowm	K94 A5	33.4		20.2	
El Kowm	I89 A3a base	34.1		22.0	
El Kowm	I89 A3a base	34.4		21.6	
El Kowm	L92 A4	31.0	29.0	20.6	
El Kowm	KJ89-91 A3c	31.5	31.3	21.3	
El Kowm	N78 B3	33.2		19.9	
El Kowm	NP 79	30.6	29.7	19.0	
El Kowm	P79	29.8	28.2	19.0	13.7
El Kowm	M93 A2b	32.7		20.0	
Tell Sheikh Hassan	6Z20	29.1	28.3	18.6	16.6
Tell Sheikh Hassan	6Z9	32.2	30.5	20.0	17.0
Tell Sheikh Hassan	6Z32	35.4	33.5	22.4	19.0
Tell Sheikh Hassan	6Y30	29.0	27.0	17.8	14.7
Tell Sheikh Hassan	6Z42	34.6	33.2	22.6	19.7
Tell Sheikh Hassan	7Z10	35.0	33.2	22.5	19.0
Tell Sheikh Hassan	7Z4	37.5	36.3	24.0	21.3
Tell Sheikh Hassan	7O23	35.0	33.5	22.7	20.0
Tell Sheikh Hassan	7O7	33.2	32.5	21.0	18.0
Tell Sheikh Hassan	7Z42	32.8	30.5	19.8	18.0
Tell Sheikh Hassan	9P27	35.5	34.5	22.5	19.5
Tell Sheikh Hassan	8Y50	36.2	34.5	22.2	19.5
Tell Sheikh Hassan	9N9	33.5	31.5	21.5	19.2
Tell Sheikh Hassan	9I8	30.5	29.5	19.5	17.0
Tell Sheikh Hassan	OV4	34.0	31.8	21.7	19.3
Tell Sheikh Hassan	7O59-60	32.5	31.0	19.5	18.5
Tell Sheikh Hassan	7O23-26	33.5	33.0	21.5	18.8
Tell Sheikh Hassan	7O13	35.5	33.5	21.5	19.5
Tell Sheikh Hassan	9N2	29.5	28.5	20.0	16.0
Tell Sheikh Hassan	9Y32	32.3	30.5	21.3	18.7
Tell Sheikh Hassan	9Y86	33.6	31.5	19.5	18.3
Tell Sheikh Hassan	7O45	28.5	26.5	18.0	15.5
Tell Sheikh Hassan	7Z29	35.0	33.5	21.5	19.5
Tell Sheikh Hassan	8Y87	36.2	34.2	22.5	20.0
Tell Sheikh Hassan	9Y58	33.5	31.2	21.5	19.0

Tell Sheikh Hassan	9Y58	31,8	30,5	20,8	17,8
Tell Sheikh Hassan	9Y57	31,2	29,3	20,5	16,8
Tell Sheikh Hassan	9P15	31,5	31,2	22,2	18,7
Tell Sheikh Hassan	0P20	31,5	29,5	21,5	16,5
Tell Sheikh Hassan	0P45	32,0	29,8	20,9	18,2
Tell Sheikh Hassan	9Y70	33,2	31,7	20,2	18,2
Tell Sheikh Hassan	0P34	31,5	30,5	20,5	18,2
Tell Sheikh Hassan	9Y123	29,2	27,5	18,8	16,0
Tell Sheikh Hassan	0P49	32,0	30,6	21,1	18,2
Tell Sheikh Hassan	0P49	34,5	32,5	22,3	19,2
Tell Sheikh Hassan	8S25	33,0	31,8	20,0	18,0
Tell Sheikh Hassan	9Y118	33,5	33,2	21,5	18,0
Tell Sheikh Hassan	9R11	29,0	27,2	19,0	15,4
Tell Sheikh Hassan	9Y123	34,5	33,5	21,5	20,1
Tell Sheikh Hassan	8Y18	34,0			18,5
Tell Sheikh Hassan	0M10	33,5		21,0	18,2
Tell Sheikh Hassan	9Y86	31,8		18,9	17,2
Tell Sheikh Hassan	0I6	32,0		20,5	18,2
Tell Sheikh Hassan	9V7	34,2	32,5	20,5	
Tell Sheikh Hassan	9Y103	31,0	29,7		17,3
Tell Sheikh Hassan	9R11			21,0	18,2
Kharab Sayyar	A037	29,7	28,7	18,8	17,9
Kharab Sayyar	A101	30,4	29,5	18,5	16,6
Kharab Sayyar	A131	30,8	30	21,1	18,2
Kharab Sayyar	A131	28,8	27	18,8	16,1
Kharab Sayyar	A305	30,1	28,8	19,2	17
Kharab Sayyar	A328	29,2	/	/	15,8
Kharab Sayyar	A719	28,5	26,5	18	16,5
Kharab Sayyar	A0	30,3	28,7	19,7	17,1
Tell Chuera	K050	29,5	29	20	17,2
Tell Chuera	K309	28	27,2	18,7	16,3
Tell Chuera	K309	28,2	27,2	19,2	16,2
Tell Chuera	K418	29	27,5	18,5	16,5
Tell Chuera	K638	30,5	30	19,2	17,5
Tell Chuera	H0093	28,5	27,5	17,5	16
Tell Chuera	H0219	30,2	29	19,2	17,8
Tell Chuera	A1040	31,2	29,7	19,0	17,9
Tell Chuera	B1009	33,5	31,5	20,2	18,0
Tell Chuera	A1031	32,3	30,8	19,9	18,0
Tell Chuera	H3030	28,2	26,6	18,0	16,7
Tell Chuera	F2504	28,0	27,0	18,7	15,1
Tell Chuera	F2517	34,5	31,6	21,8	19,0
Tell Chuera	HIV j3:4	29,3	27,5	18,2	15,7
Tell Chuera	HIV j4:12	28,9	26,7	19,1	16,1
Tell Chuera	HIH c10:25	30,0	29,0	19,9	16,8
Tell Chuera	F3506	29,6	28,2	18,5	16,5
Tell Chuera	H5002	30,2	28,2	20,0	15,2
Tell Chuera	F3530	29,0	28,0	18,5	16,3
Tell Chuera	A4038	30,3	29,2	19,7	17,2
Tell Chuera	A4013	28,5	27,5	18,0	16,2
Tell Chuera	F3506	28,5	27,8	19,2	16,7
Tell Chuera	H5011	31,0	30,2	20,5	17,5
Tell Chuera	H5011	29,8	28,6	18,2	16,8
Tell Chuera	B4052	32,0	30,6	19,7	17,2
Tell Chuera	B4052	30,1	29,8	19,2	16,8
Tell Chuera	HIH a9:13	32,5	30,5	22,5	18,2
Tell Chuera	A4026	28,0	27,0	17,6	16,5

Tell Chuera	A2066	29.9	28.5	20.0	17.0
Tell Chuera	H5006	30.0	28.2	18.8	16.5
Tell Chuera	A3513	31.9	30.8	20.0	17.5
Tell Chuera	A3551	31.3	29.5	20.0	17.0
Tell Chuera	A3544	31.0	29.2	20.1	16.8
Tell Chuera	A3544	32.6	31.0	19.0	17.8
Tell Chuera	A3547	30.2	29.0	19.1	16.4
Tell Chuera	A3547	31.7	30.6	20.0	17.7
Tell Chuera	A3551	29.9	28.8	19.3	16.8
Tell Chuera	HIII c9:44	27.0	26.2	17.9	15.2
Tell Chuera	DVIII b9:12	31.8	31.0	18.7	17.0
Tell Chuera	A3551	29.9	28.9	18.7	16.6
Tell Chuera	A3551	32.1	30.9	20.4	18.2
Tell Chuera	A3519	28.4	27.5	17.5	16.2
Tell Chuera	A3522	29.9	27.3	19.1	16.6
Tell Chuera	A3522	31.2	30.0	20.1	18.3
Tell Chuera	A2079	30.2	29.2	18.6	16.3
Tell Chuera	HIII a9:50	32.0	29.8	20.2	16.5
Tell Chuera	A3013	30.7	30.0	20.2	17.2
Tell Chuera	A3064	32.0	31.0	20.3	17.5
Tell Chuera	A3041	32.5	30.8	21.0	17.3
Tell Chuera	A3041	29.0	28.6	18.7	16.4
Tell Chuera	A3510	30.5	29.8	18.7	17.3
Tell Chuera	A3545	30.0	28.5	19.9	17.2
Tell Chuera	A3562	29.3	28.6	17.2	16.2
Tell Chuera	A3564	31.6	31.0	20.3	18.2
Tell Chuera	A3553	28.8	27.6	18.4	16.0
Tell Chuera	K303/304	31.3	/	/	18.2
Tell Chuera	K063	28	/	19	16
Tell Chuera	H0430	31	/	20	17.8
Al Rawda	5012	26.2	21.8	16.8	15.2
Al Rawda	2049	31.6	30.5	20.4	17.8
Al Rawda	1004	30.3	28.3	18.1	15.8
Al Rawda	1223	30.7	29.1	19.7	17.1
Al Rawda	1223	29.6	28.9	20.3	16.5
Al Rawda	1223	27.5	26.8	17.4	15.5
Al Rawda	1223	27.3	26.6	17.2	15.3
Al Rawda	1223	29	27.8	17.6	16.1
Al Rawda	1223	28.6	17.6	17.2	15.3
Al Rawda	2027	30.5	28.8	20.8	17.5
Al Rawda	2036	34.2	32.9	21.6	19.7
Al Rawda	2010	28.2	27.1	18.9	16.6
Al Rawda	5005	28.5	28.2	18.8	16.2
Al Rawda	5003	31.3	30.1	19.6	17.6
Al Rawda	1621	28.2	27	18	16
Al Rawda	1621	29.8	28.2	18.2	16.1
Al Rawda	2202	26.5	25	17.2	14.8
Al Rawda	2203	28.9	27.5	16.2	15.2
Al Rawda	2220	30.8	28.5	19	17
Al Rawda	1370	29.2	27.3	18.8	16.2
Al Rawda	4303	29.5	28.2	20	16.5
Al Rawda	4293	29.9	29	19	16.3
Al Rawda	4293	29.2	28	19.1	16.2
Al Rawda	1021	/	27.7	/	/
Al Rawda	2202	/	/	19	17
Al Rawda	2202	28	/	17.5	15.6

¹ Peters *et al.* 2005, 96 and following.

² Davis 1987, 61; Helmer 1992. Due to the development of animal husbandry and the improvement of breeds, difference in size and weight between breeds has become very important. Some sheep breeds are larger than the mouflon, while feral sheep as the 'mouflon de Corse' or the Soay sheep are smaller than their wild ancestor (body size of insular mammals may differ from those of the mainland conspecifics, see Mairi *et al.* 2005).

³ There are some difficulties in distinguishing the archaeological remains of sheep and goats, particularly if they are not so well preserved, however discrimination criteria have been highlighted on the skeleton (Boessneck *et al.* 1964 and Prummel and Frisch 1986) and on teeth (Payne 1985, Helmer 2000, Halstead *et al.* 2002 and Gillis *et al.* 2011), that enable the identification at the species level of at least a part of the caprines remains.

⁴ Helmer *et al.* 2007, 49.

⁵ Vila 2006.

⁶ Vila 1998, 90.

- 7 Vila 1998, 143.
- 8 Vila 2002.
- 9 Becker *et al.* 2007, 245–250.
- 10 Vila ongoing study.
- 11 Vila 2010.
- 12 Vila 2010.
- 13 Vila and Al Besso in print.
- 14 Simpson 1941. Simpson's log ratio method was developed in order to 'compare graphically the relative rather than the absolute dimensions of a number of animals or groups of animals'. This technique provides comparisons, both of size and shape, for a single bone or a group of bones. For each dimension the difference between the logarithmic value of the standard or reference and each of the other specimens or groups is calculated. Each log ratio value is plotted with the 'reference' being 0. Here for size comparison of talus bones between archaeological periods, the reference is provided by PPNA mouflon talus bones (N = 7).
- 15 Escarguel 2012, 3–24. Bootstrapping is a technique whereby the data collected in an initial sample is randomly resampled over and over again. This procedure is recommended if the sample size is insufficient for straightforward statistical inference.
- 16 Teichert 1975.
- 17 In Egypt, in ancient Maadi, the bone remains from the fourth millennium BC attest long-legged sheep with spiral horn cores and a withers height average of 71.4 cm: Boessneck *et al.* 1989, 98.
- 18 Davis 1987, 68–72.
- 19 Davis 1996, 601.
- 20 Searle *et al.* 1989 ; Kamalzadeh *et al.* 1998.
- 21 Vila 1998, 40–41 and 103–104.
- 22 Popkin *et al.* 2012, 8.
- 23 Popkin *et al.* 2012, 8.
- 24 Paleontological statistics software package: Hammer *et al.* 2001.
- 25 No evidence of size variation for the other wild or domestic ungulates (Vila 1998, 40–41 and 103–104).
- 26 Nutrition has no particular effect on the talus bone (Popkin *et al.* 2012, 8).
- 27 Van Buren 1939.
- 28 Duerst and Gaillard 1902, 46–48.
- 29 The tall and heavy West African long-legged sheep (i.e. Uda, Fulani, Peul sheep, Sahel type, Bali-Bali, Bororo...) with thin tail and long spiral horns for the male (polled ewes) is widespread from the Guinea savannah through the Soudan to Sahel (Epstein and Mason 1971). The Uda sheep (Trevor Wilson 1991, fig. 70) is a fairly large hairy sheep breed adapted to arid environments, as are most of the West African long-legged sheep. It is also possible to find breeds in India, like the Ganjam, the Kilakarsal, the Ramnad or the Nellore, that have horizontal spiral horns (Acharya 1982). The fleece is coarse and hairy, the tails, short or long, are thin.
- 30 Heinrich 1936, 23–25; Hilzheimer 1936, 50–51.
- 31 A fat-tailed sheep appears on a fragment of stone bowl from the Uruk III (c. 3000 BC – Zeuner 1963, 151, fig. 85). A fat-tailed sheep is also pictured on a gold file from the Ur cemetery (c. 2500 BC – Woolley 1934, pl. 139, U8173).
- 32 Wool is very clearly depicted on the golden figure of a ram that belongs to the jewelry pieces found in the Queen Puabi's Tomb in Ur (Woolley 1934, pl. 141b – U10948).
- 33 The theme of animal rows is rather old and could represent wild and domestic species. A similar row of four animals (a deer-like animal, a goat-like animal, a bull and a ram) figures in the same order on a cylinder seal from Khafadjeh (Protoliterate period c – Frankfort 1955, pl. 7–39) and in a different order on cylinder seals from Tell Asmar (Early Dynastic II – Frankfort 1955, pl. 43–462) and Fara (Early Dynastic, Martin 1988, p. 270, no. 455).
- 34 Castellino *et al.* 1966, Tav XLIV.
- 35 As far as we know, apart from the two horn core fragments from Tell Asmar (Hilzheimer 1941, 37, fig. 13), no spiral horn core of sheep has been surely identified in the Near East in contrast to Egypt: (Kokabi 1980, 524 – taf. 2; Boessneck 1989, 96, plate XXIX). However after revision of the horn core drawings from Uruk sites, a spiral horn core could be present in El Kowm (Vila 1998, 101, fig. 70–3). One has to be aware of the possibility to find the two kinds of horn core in Near Eastern sites.

3. Sheep, Wool and Textile Production. An Interdisciplinary Approach to the Complexity of Wool Working

Eva Andersson Strand

In discussing the social, cultural and economic roles of wool textile production in the Ancient Near East, it is important to be aware of the complexity of the processes and all the different stages this work includes. Diverse sheep breeds are mentioned in early records and texts also show that wool was sorted into various categories, teased and/or combed, and spun and woven in different qualities. How did these processes affect the final product, the textile? We need to consider that the type of textile produced is dependent on the need and desire of the user and also on the type of raw materials and techniques accessible. A wool textile can be coarse and waterproof and may be used for an outer garment, or on the other hand it can be very fine and smooth with many threads per centimetre, woven using an elaborate technique and given as a precious gift. The type of wool used, the time needed for production and the different production stages vary in the manufacturing of these different textiles.

The challenge is, how do we estimate ancient textile craftspeople's ability and skills, and is it possible to compare the time it takes craftspeople today with the time it would have taken craftspeople in the past. What do we know about different techniques used in the Ancient Near East, when very few textiles are preserved? In order to gain a better understanding of textile production in ancient societies, different methods can be used and combined. Three of the most common are ethnographic studies, experience archaeology and experimental archaeology. By combining the knowledge gained from these approaches with archaeological and textual information, it is possible to gain a better and clearer understanding of the manufacture of woollen textiles (Fig. 3.1).¹ In order to provide information that can be used when discussing the impact of wool and the wool industry in the Ancient Near East, the focus in this article is on the possibilities regarding the use of such an interdisciplinary approach.

Through ethnographic sources, we often have knowledge of tool functions and different processes, such as fibre preparation, spinning and weaving.² Without all the knowledge we have gained from these studies it would be difficult to discuss textile techniques and textile processes.

Experience archaeology has the reputation of not being a scientific method since

it cannot be used for specific archaeological interpretations; nevertheless, it is a highly important approach.³ When working with crafts and production, in order to make a good interpretation of archaeological material and/or context, is it important to have an awareness of methods and techniques, even if there is no intention of becoming a skilled craftsman. This awareness can be obtained via hands-on experience.

Experimental archaeology is closely connected to the use of ethnographic parallels in archaeology. Both experimental archaeology and ethno-archaeology are seen as having been developed within the same research tradition, which is related to the use of analogies in archaeology. Experimental archaeology is a method that can provide important insights for archaeological research. This is done primarily by practical tests performed on the basis of questions related to archaeological data. An important part of experimental archaeology is the testing of the function and efficiency of textile tools and equipment.⁴ As such, experiments form a link between textiles and textile tools and contribute to a better understanding of textile production and its complexity. The results from experiments form an important basis for the interpretation of the function of different tools and for the evaluation of what textiles could have been produced in different sites and regions.⁵

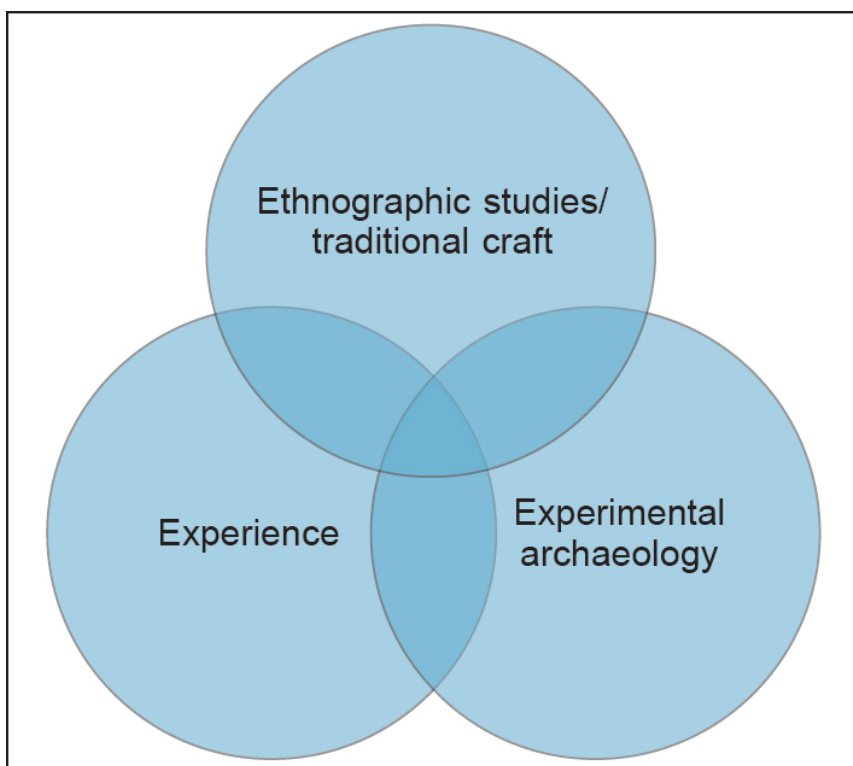


Fig. 3.1 Different approaches used, in archaeological textile research. Andersson Strand. 2011.

By combining these methods and approaches in the study of specific archaeological materials and their relation to an archaeological context and furthermore considering the needs and desires, the possibilities and limitations that people had in a given time and region one will gain a better understanding of the textile production and its impact on society and it will be possible to better visualize textiles in places where none have been preserved.

Therefore, in order to understand the complexity of wool and wool preparation, it is essential to have practical experience. During a workshop ESF Exploratory Workshop: 'Wool Economy in the Ancient Near East and the Aegean: From the Beginnings of Sheep Husbandry to Institutional Textile Industry',⁶ a hands-on session was arranged by the present author, Antoinette Rast-Eicher and Catherine Breniquet. In this session, practical introductions into various aspects of ancient textile production and its complexity were given via hands-on experience archaeology. The aim was to provide a practical introduction into different stages of wool fibre preparation and spinning so that the knowledge obtained could serve as inspiration for generating questions to be explored in archaeological and historical research. The teaching was based on the experience, knowledge of textile craftsmanship and archaeological evidence as well as archaeological experiments. All workshop participants had the opportunity to try out different techniques associated with wool processing, but also to obtain experience of different types of wool and their characteristics. Furthermore, wool sorting and wool combing and preparation for spinning were demonstrated, and hand spinning was also tried. During this session, there was a lively and interesting debate and everybody participated with great enthusiasm. It is evident that the practical approaches provided new information for many of the participants but also raised research new questions.



Fig 3.2. Different wool types. a: a grey wool with coarse fibres; b: white wool type with thin fibres.
Photo © CTR.

In the following paper, the focus will thus be on sheep, wool and wool processing with the aim of examining some aspects that are of importance when discussing wool economy in archaeological and historical research.

1. The raw material

1.1. Wool varieties

The hair of different animals, sheep and goat, camel, horse and even dog has been

used to make textiles. Wool fibres are elastic and flexible. Woollen textiles, whether woven or felted, have good insulating properties, because of the air pockets between the kinks that are present in the fibres. They also provide good protection against intense heat, since they are not highly flammable.⁷

Different sheep breeds are likely to have existed very early in many regions. Different types of wool are preferable for making different types of textiles. Coarser wool fibres are better for some types of textiles while fine wool is preferable for other types (Figs 3.2a and 3.2b). An analysis of a textile fragment from Arslantepe, Turkey, dated to 3000–2750 BC, indicates that goat wool was also used as a textile raw material during this early period. The fibres in this fragment are extremely fine and the thread has a diameter of 0.1 mm.⁸ However, goat fibres can also be very coarse, today goat hair is still used in the production of Bedouin tents. It has also been suggested that goat hair was used for the production of strings, ropes and braided mats during the Ur III period.⁹

a	
1=375g wool prepared for spinning	
100% clean wool	
1=kg6,000 m yarn	
75 kg200,000 m yarn	
1=400,000m yarn	
+ 80 m yarn for the setup (c. 2 %)	
1=200,000 mm ² of fabric	
b	
1=375g wool prepared for spinning	
100% clean wool	
1=kg6,000 m yarn	
37.5 kg200,000 m yarn	
1=400,000m yarn	
+ 80 m yarn for the setup (c. 2 %)	
600,000mm ² of fabric	

Table 3.1. Calculation on two examples of the outcome of wool for textile production. a: 750 g wool prepared for spinning; b: 375 g wool prepared for spinning.

Wool quality varies not only between different breeds, but also between individual sheep within the same breed, and is further affected by the climate, the food the sheep eats, etc.; for example, the wool on sheep living in a cold and wet climate is more greasy than the wool on sheep living in a warmer climate.

The wool yield of a sheep depends on the breed, and also varies according to whether the sheep is a ram, ewe, lamb or wether. The food and type of climate will again also have an effect. It has been estimated from textual sources that the annual raw wool yield per mature sheep in Mesopotamia would have been approximately 0.7 kg to 1.12 kg.¹⁰ This can be compared with the estimated 0.5 kg to 1 kg (with a concentration at just over 750 g) annual raw wool yield per mature sheep in Aegean ancient societies.¹¹ However, a lot of wool is lost during sorting and processing, and as is clearly demonstrated in Table 3.1 (a and b), it is important to know if the number of kilos refers to wool for textile production or to the amount of wool obtained from the sheep, especially if one relates the number of kilos to production.¹²

1.2. Wool plucking

Wool was obtained by plucking or cutting and maybe combing throughout antiquity. Shears may have been utilised in later periods, but the oldest tools used were probably knives. A sheep can only be plucked once a year, when it is moulting, whereas it can be sheared twice a year. Primitive sheep moult during late spring/early summer, although the timing of the moulting varies between the northern and southern regions of the Near East, and between lowland and highland areas.¹³ Plucking has the advantage that it removes the previous year's growth while leaving the new growth.

Today, a trained person can pluck a small sheep in approximately 50 minutes; in a 10 hour day it would therefore be possible to pluck 10–12 sheep.¹⁴ It would take a large number of people to pluck the large flocks suggested in the Ur III texts in a short period of time.¹⁵ If the wool is plucked too early, the fibres are not sufficiently weakened, while if it is left too long, the previous year's fibres will be mixed with the new; in both cases, the wool is difficult to pluck as a result, and the wool quality would result in a poor quality textile.

A third method is combing the wool from the fleece. This method is still used on goats from Orenburg, Russia, for example. Harvesting the fine goat hair is a painstaking task: the fleece is only combed once a year, in the spring, and it takes at least three years of difficult work to get 0.3–1 kg of goat hair from one animal.¹⁶

Discussion regarding how the diameter of wool fibres can be related to different sheep breeds and to the development of the woolly sheep is ongoing.¹⁷ However, as noted above, the quality of wool fibres varies between breeds, between individuals within the same breed, and between rams, ewes, lambs and wethers. The coarseness of wool fibres also varies according to which part of the sheep the wool is from; wool from the sides and shoulders is finer and shorter than wool from the thighs, for example. Furthermore, sheep wool contains three different parts: hair, under wool and kemp (Fig. 3.3).¹⁸

1.3. Wool sorting

The sorting and processing of wool fibres has an effect on the spun yarn.¹⁹ Once they have been plucked/cut, the fibres can be sorted, if desired, according to criteria such as colour, fineness, crimp, length and/or strength.

The wool can also be washed, either before the wool is plucked/cut or after. Washing the wool before spinning washes out the lanolin (the natural wool grease that helps to 'glue' the fibres together during spinning), so a little fat then has to be added. The wool has to be washed if it is to be dyed, or the dyestuff will not penetrate the fibres.

The wool can be spun immediately after it has been plucked/cut, but it is usually first teased by hand or combed with the aid of combs with shorter or longer teeth in order to remove dirt and tangles. This makes the spinning process easier and produces a more evenly spun yarn. There are various combing techniques (Fig. 3.4). Combing is mentioned in the Ur III texts and in Linear B inscriptions, but there are few archaeological finds of combs that can be considered wool combs.²⁰ One can comb with one comb or two. During later periods there are finds of combs with iron teeth that were used in pairs. Combing also separates the long hair from the under wool (the short wool fibres). How well the different fibres are separated depends on the space between the teeth of the comb. The under wool can also be teased out with the aid of a teasel.

The wool fibres can alternatively be flogged with a whip. If the entire fleece is beaten, it is important to do this carefully so that all the fibres are well mixed. The considerable amount of wool that is rejected during these various processes could have been used for other purposes such as filling, felting and corking.

In wool sorting and combing tests carried out at the Danish National Research Foundation's Centre for Textile Research (CTR), one crafts-person prepared and combed c. 14.16 g an hour; if working 8 hours, equal to c. 114 g a day.²¹ The amount of prepared wool is similar to information provided in texts, although it is not possible, of course, to know how many hours a day a person would have worked in the Ancient Near East.²²



Fig. 3.3. Wool fibres: (left) hair, (right) underwool. Photo © CTR.

Fibre preparation must also be taken into account in a discussion of the development and presence of different sheep breeds. In a test, six wool samples taken from two ewes from the same breed and flock were sent for fibre analysis, with no information on the number of sheep they were from, or on the types of fibres. Two of the samples were mixed, with both hair and under wool, two samples contained only hair and were combed and two were carded with just under-wool. If the results of the analysis had been interpreted as representing different breeds, no less than six individual sheep would have been identified, demonstrating that it is necessary to be cautious when using results from fibre analysis in an interpretation of the development of wool fibres.²³



Fig. 3.4. a: wool combing; b: wool fibres prepared for spinning. Photo © CTR.

Textile analyses show that different types of fibres and yarns have been used for making different types of textiles.²⁴ This, together with the possibility of dividing wool into several fibre types, may explain why different categories of wool are frequently mentioned in the written sources.²⁵ The Ur III texts, for example,

indicate that wool was sorted into five categories, with category one being the finest fibres and the fifth category being the coarsest. Fibre quality is also clearly related to the breed of sheep; the wool from the fattailed sheep, for example, was categorised as qualities one and two, while the wool of the highland/mountain sheep was coarser and in general was categorised as qualities four and five.²⁶ The best type of fibres to use depends on the type of textile to be produced; for example, if making an outer garment, a coarse and long fibre and a strong yarn would be preferable, whereas for a blanket for a new born child, a soft yarn, spun with a thin and short fibre, would be more suitable. In a large scale production, the need for homogenous wool would have been substantial, and this must also have affected the breeding.

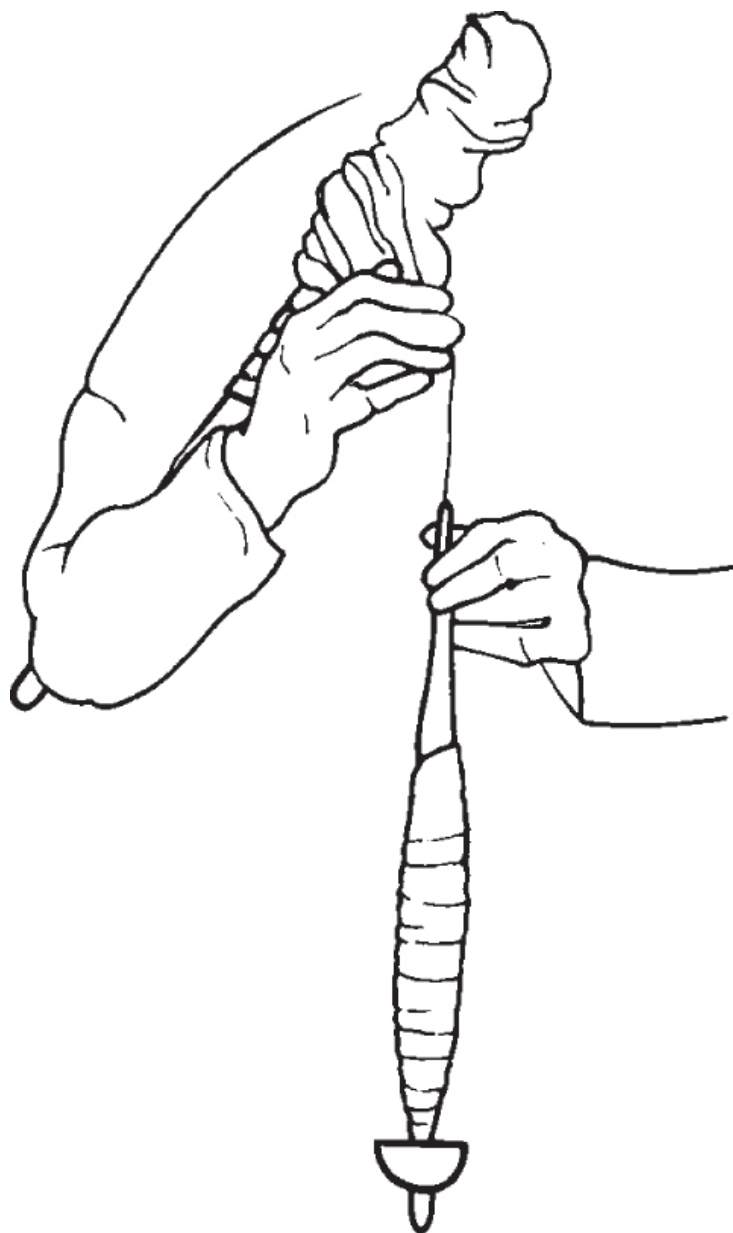


Fig. 3.5. Spinning on a dropspindle with the aid of a distaff. Drawing Tina Borstam © Eva Andersson Strand and CTR.

2. Spinning and weaving wool²⁷

In order to spin a homogeneous and even thread it is important to use well

prepared wool. Wool can be spun with all types of spinning tools and spinning techniques. It can be spun very thin with a light spindle and thick with a heavier spindle. One can weave a woollen cloth on all types of loom, but in the author's opinion it is easier to weave a dense linen tabby than a dense wool tabby on a ground loom or a two-beam vertical loom. The warp-weighted loom is excellent for weaving a dense twill cloth, because the sheds are separated. This is because there are always some fibres sticking out from the spun woollen thread that will make the threads cling to each other, which creates problems during weaving and damages the threads; separating the threads into more sheds eases this problem. The threads can also be treated with something, for example wax, but this would have taken a considerable amount of time.

3. Dyeing wool

Wool comes in a variety of natural colours, and these different colours were utilized in textile manufacture. The same sheep can also have several natural shades.²⁸ The different colours can be sorted and spun separately, in order to take advantage of the different shades in the weave.

According to iconography and written sources, it is clear that some textiles were dyed.²⁹ The dyer can colour textile material at the fibre, yarn or cloth stage. In practice, the stage at which dyeing takes place varies mostly according to the textile fibres used and the desired effect.³⁰ There are different dyeing techniques, for example:

- *Direct dyeing*: this involves soaking or boiling certain plants in water, and then immersing the fibres in the resulting dye bath and, in order to make the dyes more colourfast, in combination with various metallic salts, and
- *Vat dyeing*: a technique used to dye with indigo and molluscs. A process that involve a reduction process in alkaline conditions.³¹

Different combinations can be used to obtain different colours. For example, if a grey yarn is dyed in a yellow dye bath, the yarn will become greenish; if an indigo coloured yarn is dyed in a red dye bath, the yarn will be purple.

Numerous plants could have been used for dyeing; for example, a blue colour could have been obtained from woad (*Isatis tinctoria* L.), a red colour from dyer's madder (*Rubia tinctorum* L.) and yellow from dyer's weed (*Reseda luteola* L.) and saffron (*Crocus sativus* L.).³²

However, there are very few plants that give a red and blue colour, while for example yellow, brown, and green colours can be obtained from several plants.

4. Finishing

4.1. Felting

Felt is a non-woven cloth and is usually made by a process called wet felting. The cleaned wool is placed horizontally, for example on a mat, in layers corresponding in shape to what is desired for the finished piece and the natural wool fibres both hair and under wool are then stimulated by heat, friction and lubricated by moisture (usually soapy water) and matted together. However, the felt will shrink during the process so the area has to be larger than the required size of the textile. This method can be used for producing larger textiles, for example tents and mats, but also hats, gloves and socks. Felt is known in Anatolia from the Early Bronze

Age and perhaps even earlier.³³

4.2. Fulling

After the fabric has been taken off the loom, it can be fullled in order to make the textile denser. If a textile is fullled, it will become more waterproof, which is preferable when producing an outer garment. The fabric is kneaded, stomped and pounded in wet and preferably warm conditions until the surface is matted to the desired degree.³⁴

4.3. Sewing

Since there are no preserved costumes or other complete textiles from this region and period, there is little information on sewing and sewing techniques. However, finds of sewing needles demonstrate that at least some textiles were sewn and could also have been embroidered. It is best to use a thin needle when sewing a fine fabric, while it is easier to use a larger bone needle when sewing coarser and fullled fabrics.

*

The importance of wool cannot be underestimated. The use of wool, for textiles, trade, etc., had an important impact on ancient societies. Wool comes in many different types and qualities and it is evident that there was an awareness of this in the Ancient Near East. Different qualities were used for different types of textiles. The introduction of wool could also have led to the use of new tools and new technology in this area. However, it was the needs and preferences of both the society as well of individuals, in combination with availability, that conditioned the possibilities of the development of new breeds of sheep and the use of this textile raw material. Many people must have been highly skilled and specialists in this area of expertise. It is clear that they would have had knowledge of not only sheep rearing but also various, complicated textile techniques; combing, spinning, weaving, dyeing, fulling, *etc.* It is not possible to make a direct comparison between skilled craftspeople today and craftspeople in ancient societies. However, by learning from modern craftspeople and combining this knowledge with studies of archaeological and historical sources, it is possible to gain a deeper insight into the significance and complexity of the wool economy in the past.

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Bibliography

- Andersson, E. (2003) *Tools for Textile Production from Birka and Hedeby*. Birka Studies 8. Stockholm.
- Andersson Strand, E. (2010) *Experimental Textile Archaeology*, NESAT 11. 10th North European Symposium for Archaeological Textiles, Copenhagen 2008, 1–3. Oxford.
- Andersson Strand, E. (2010) *The Basics of Textile Tools and Textile Technology: From Fibre to*

- Fabric. In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 10–22. Ancient Textiles Series 8. Oxford.
- Andersson Strand, E. (2012) From Spindle Whorls and Loom Weights to Fabrics in the Bronze Age Aegean and Eastern Mediterranean. In M.-L. Nosch and R. Laffineur (eds), *KOSMOS, Jewellery, Adornment and Textiles in the Aegean Bronze Age. 13th International Aegean Conference Held at Copenhagen, April 2010/13ième Rencontre égéenne, Copenhagen, avril 2010*, 207–214. Aegaeum 33. Liège.
- Andersson Strand, E. (2012) The Textile *Chaîne Opératoire*: Using a Multidisciplinary Approach to Textile Archaeology with a Focus on the Ancient Near East. In C. Breniquet, M. Tengberg, E. Andersson Strand and M.-L. Nosch (eds), *Préhistoire des Textiles au Proche-Orient/Prehistory of Textiles in the Near East. Paléorient* 38, 21–40. Paris.
- Andersson Strand, E., and Cybulska, M. (2013) Visualising Ancient Textiles – How to Make a Textile Visible on the Basis of an Interpretation of an Ur III Text. In M.-L. Nosch H. Koefoed and E. Andersson Strand (eds), *Textile Production and Consumption in the Ancient Near East Archaeology, Epigraphy, Iconography*, 113–127. Ancient Textiles Series 12. Oxford.
- Andersson Strand, E., Frei, K., Gleba, M., Mannering, U., Nosch, M.-L., and Skals, I. (2010) Old Textiles – New Possibilities, *European Journal of Archaeology* 13, 149–173.
- Andersson Strand, E. and Nosch, M.-L. (eds) (In press) *Tools, Textiles and Contexts. Investigating Textile Production in the Aegean and Ancient Near East Bronze Age*. Ancient Textiles Series. Oxford.
- Andersson Strand, E. and Olofsson, L. (In press) Textile Production in Vorbasse. In U. L. Hansen (ed.), *The Vorbasse Textile Research Program*. Copenhagen.
- Barber, E. J. W. (1991) *Prehistoric Textiles: The Development of Cloth in the Neolithic and Bronze Ages with Special Reference to the Aegean*, Princeton.
- Breniquet, C. (2008) *Essai sur le tissage en Mésopotamie; des premières communautés sédentaires au milieu du IIIe millénaire avant J.-C.* Travaux de la Maison René-Ginouvès 5. Paris.
- Breniquet, C. (2013) Functions and Uses of Textile in the Ancient Near East. Summary and Perspectives. In H. Koefoed, M.-L. Nosch and E. Andersson Strand (eds), *Textile Production and Consumption in the Ancient Near East Archaeology, Epigraphy, Iconography*, 2–25. Ancient Textiles Series 12. Oxford.
- Broudy, E. (1979) *The Book of Looms: A History of the Handloom From Ancient Times to the Present*. London.
- Cardon, D. (2007) *Natural Dyes, Sources, Tradition, Technology and Science*. London.
- Crowfoot, G. M. (1931) *Methods of Hand Spinning in Egypt and the Sudan*. Bankfield Museum Notes 12. Bankfield Museum, Halifax.
- Firth, R. and Nosch, M.-L. (2012) Spinning and Weaving Wool in UR III Administrative Texts. *Journal of Cuneiform Studies* 64, 53–70.
- Gleba, M. (2008) *Textile Production in Pre-Roman Italy*. Ancient Textiles Series 4. Oxford.
- Good, I. (2007) Invisible Exports in Aratta: Enmerkar and the Three Tasks. In C. Gillis and M.-L. Nosch (eds), *Ancient Textiles. Production, Craft and Society*, 179–184. Ancient Textiles Series 1. Oxford.
- Hochberg, B. (1977) *Handspindles*. Santa Cruz.
- Michel, C. and Nosch, M.-L. (eds) (2010) *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*. Ancient Textiles Series 8, Oxford.
- Peacock, E. E. (2001) The Contribution of Experimental Archaeology to the Research of Ancient Textiles. In P. Walton Rogers, L. Bender Lørgensen and A. Rast-Eicher (eds), *The Roman Textile Industry and its Influence. A Birthday Tribute to John Peter Wild*, 181–192. Oxford.
- Petruso, M. K. (1986) *Wool-evaluation at Knossos and Nuzi, KADMOS*. Zeitschrift für Vor- und Frühgriechische Epigraphik, 26–37.
- Pettersson, B. and Narmo, L. E. (eds) (2011) *Experimental Archaeology: Between Enlightenment and Experience*. Acta Archaeologica Lundensia Series in 8. Lund.
- Potts, D.T (1997) *Mesopotamian Civilization: The Material Foundations*. Cornell.
- Rast-Eicher, A. (2008) *Textilien, Wolle, Schafe der Eisenzeit in der Schweiz*. Antiqua, 44. Basel.
- Ryder, M. (1983) *Sheep and Man*. London.
- Ryder, M. (1983b) A Re-assessment of Bronze Age Wool. *Journal of Archaeological Science* 10, 327–331.
- Ryder, M. (2005) The Human Development of Different Fleece-types in Sheep and its Association

- with Development of Textile Crafts. In F. Pritchard and J. P. Wild (eds), *Northern Archaeological Textiles*, 122–128. NESAT 7. Oxford.
- Tiedemann, E. J. and Jakes, K. A. (2006) An Exploration of Prehistoric Spinning Technology: Spinning Efficiency and Technology Transition, *Archaeometry* 48, 293–307.
- Waetzoldt, H. (1972) *Untersuchungen zur neusumerischen Textilindustrie*, Studi Economici e Tecnologici I, Istituto per l'Oriente. Rome.
- Waetzoldt, H. (2007) The Use of Wool for the Production of Strings, Ropes, Braided Mats and Similar Fabrics. In C. Gillis and Nosch, B. M.-L. (eds), *Ancient Textiles, Production, Craft and Society*. 112–121. Oxford.
- Waetzoldt, H. (2010) The Colours of Textiles and Variety of Fabrics from Mesopotamia During the Ur III Period (2050 BC). In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and the Mediterranean Area from the 3rd to the 1st millennium BC*, 201–209. Ancient Textiles Series 8. Oxford.
- Wood, F. A. and Roberts, G. A. F. (2005) Natural Fibers and Dyes. In G. Prance and M. Nesbitt (eds), *The Cultural History of Plants*, 287–313. London.
- <http://www.artisaneuro.com/index.php?shawls=yes> (accessed Friday 17 May 2013)

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- 1 Andersson Strand 2010.
 - 2 Crowfoot 1931; Hochberg 1977; Broudy 1979.
 - 3 e.g. Pettersson and Narmo, (eds) (2011)
 - 4 Peacock 2001.
 - 5 Andersson Strand *et al.* 2010.
 - 6 November 8–8-10, 2012, Nanterre, (Nanterre Université).
 - 7 Barber 1991; Andersson Strand 2012.
 - 8 Frangipane *et al.* 2009, 20.
 - 9 Waetzoldt 2008, 112–113.
 - 10 Waetzoldt 1972; Potts 1997, 92.
 - 11 Petruso 1986, 30.
 - 12 Today, different types and qualities of yarn are defined according to different 'yarn numbers'. Basic Tex Unit (TEX) is one common international system: in this system the yarn number is based on the weight of yarn per 1000 m; in general, the thinner the yarn, the lower the number (e.g. Andersson Strand 2012). If one kilo of wool is equal to a 62.5 **tex** yarn this = 16 000 m yarn per kilo wool. If one kilo is equal to a 125 **tex** yarn this = 5000 m per kilo. The hypothetical calculations in Table 3.1 are based on a 62.5 **tex** yarn. If producing a 1 m² balanced tabby textile with 20 threads per cm one would need 4,000 m of yarn to produce this fabric: 2,000 m in the warp and 2,000 m in the weft. Another 80 m (2%) should also be included for the setup.
 - 13 Barber 1991; Andersson Strand 2012.
 - 14 A. Batzer, personal communication. Batzer is a textile technician and leader of the textile workshop at the Historical Archaeological Research and Communication Centre, Lejre, Denmark. She is also in charge of the wool plucking and wool shearing.
 - 15 Waetzoldt 1972; Potts 1997.
 - 16 <http://www.artisaneuro.com/index.php?shawls=yes>.
 - 17 Waetzoldt 1972; Ryder 1983, 1992, 2005; Potts 1997; Rast-Eicher 2008; Gleba 2012.
 - 18 Ryder 1983; Barber 1991, 20–21.
 - 19 Andersson 2003, 26; Andersson *et al.* 2008.
 - 20 Waetzoldt 1972.
 - 21 Andersson Strand and Cybulska 2013, 116; Olofsson *et al.* in press.
 - 22 Waetzoldt 1972.
 - 23 Andersson Strand and Olofsson, in press.
 - 24 Barber 1991; Good 2007; Breniquet 2008, 2013.
 - 25 Michel and Nosch 2010; Firth and Nosch 2012.
 - 26 Waetzoldt 1972, 2010; Potts 1997.
 - 27 For more information on spinning and weaving techniques e.g. Crowfoot 1931; Hochberg 1977; Broudy 1979; Barber 1991; Tiedeman and Jakes 2006; Breniquet 2008; Andersson Strand 2012.
 - 28 Barber 1991; Cardon 2007.
 - 29 Nosch 2004.
 - 30 Cardon 2007.
 - 31 Cardon 2007.
 - 32 Wood and Roberts 2005; Gleba 2008.

³³ Barber 1991, 215–217

³⁴ Barber 1991.

4. The Archaeology of Wool in Early Mesopotamia: Sources, Methods, Perspectives

Catherine Breniquet

The archaeology of the ancient Near East is supposed to take into account the development of the ancient civilizations settled in a huge territory: from Istanbul to Kabul, from West to East, from the Black Sea in the north to the south of the Arabian peninsula; from the first settlers at the beginnings of the Holocene period around the 12th millennium to the conquest of Alexander the Great in 333 BC! No archaeologist could of course cover such a domain. This peculiar definition is the result of the expansion of our field of research since the middle of the 19th century and the discovery of more and more new civilizations and places to work. This situation is also the consequence of recent international troubles in the Near East. Excavations in Iraq have not been possible for the last 23 years (although archaeologists have now been back in the field for two years), meaning that new data with good archaeological contexts are not available for major sites, and that comparisons between new and old fields are, if not impossible, difficult to conduct on a perfect scientific basis.

For one who is not aware of such a chrono-cultural area, the archaeology of the ancient Near East is a difficult domain and demands specialized competences in the field. The typical archaeological Near Eastern sites, the *tells*, with mud-brick architecture composing multi-level stratigraphy and their *longue durée*, require an historical approach that is aware of the archaeological complexity and the social evolution, in terms of the non material aspects of the data. As everybody knows, archaeology cannot be restricted to excavations... It now involves many embedded aspects of the social sciences, humanities, environmental sciences as well as history of art which compose the actual picture of a complex discipline.

Faced with this long history, historians (and archaeologists) – under the exhortation of L. Oppenheim – have often try to look for cultural continuity and to explain the origins in the light of 2nd millennium Mesopotamia. Oppenheim's point of view is not incorrect, as sometimes the present helps to understand the past. But it is marked by the state of the research in the 1950s, when documentation was unclear and scattered, and when the entire prehistory of Mesopotamia had to be discovered. With regards to the topic of this workshop, Mesopotamia has been called the birthplace of wool, because of local socio-economic developments that led to its increased production, as well as local improvements in techniques for the manufacture of woollen threads and fabrics at

the end of the 3rd millennium BC. In this region, large-scale factories first began to produce fabrics and clothing in unprecedented quantities. The advent of such an economic situation is not only a matter of evolution and technical developments. It is also a question of social and historical landscape. From my point of view, the originality of the cultural emergence of the first historical civilization, the Sumerian one, has to be taken into account, as it was rooted in the development of the prehistoric settlements of the area.¹ Moreover, such a method makes it necessary to take into account the breaks, especially the one which was brought on by the advent of the Akkadian empire, which inflicted the end of the Sumerian system. Many singular studies have focused on a specific aspect of the period and on its links with wool (ration system, workers, terminology, animal management, etc.). No global overview, merging all the sources together, has been drawn from them. This is what I will try to develop here for the 'early Mesopotamia', i.e. southern Mesopotamia from the beginnings (7th millennium BC) to the conquest of Sargon of Agade, roughly 2340 BC. This 'unit', which appears coherent, ended with a kind of 'revolution' that broke down the original system based on kinship.² Material from other geographical areas and different periods will be mobilized when necessary. The aim of my contribution is to emphasize the invaluable role of an interdisciplinary approach which is for me the only way to understand how Mesopotamia started to be the 'Land of Wool' at the beginning of the 2nd millennium BC. I shall try to explain how human choices and environmental constraints acted together.³

Wool is linked to the history of sheep and its relations with man. We know that sheep were one of the first animals to have been domesticated (with goats) in the ancient Near East. The most ancient proofs came from the south-west Turkey, from the eastern foothills of the Taurus, and not from Iran as previously assumed.⁴ All wild species were found in the area from the very beginning of the Neolithic period, but goats and sheep started to be domesticated in the second half of the 9th millennium, i.e. during the early PPNB period. Evidence comes from the study of slaughtering patterns that show animal control, and not only from biometric criteria.⁵ It is still not clear how the domestication process spread out to the other areas. Where wild animals were lacking, it is easy to assume the diffusionist paradigm from the Taurus areas, for others, less well documented such as southern Mesopotamia (Fig. 4.1), it is much more difficult.

Wool is a natural textile material which covers the sheep. Contemporary sheep such as merinos, which produce the finest wool, have a coat constituted of only one type of fine, dense fibres. Our wool today is a light supple material, easy to work, crease-resistant, which offers a high thermal protection. Wool, as seen by microscopy, is like our hair, covered by scales. This wool is very different from Mesopotamian wool at its origins. Beginning in the middle of the 20th century, M. Ryder tried to reconstruct its entire story, from the wild animal to the emergence of the woolly sheep, based on his knowledge of British breeding practices. His point of view, published in several masterly studies,⁶ has become a matter of controversy as he reconstructed a very linear history, from the wild coat to the dense homogenous wool, which appears now to be imperfect. The model he used is based on the historical documents that were available at the time of his researches, but he probably did not think enough about the human choices (breeding practices but also fibre selection on the animal which have an impact on

the quality of wool and textiles). For Near Eastern archaeology, Ryder's model is the only one which has been discussed. We have to keep in mind that it was neither based on the examination of sheep skins, nor on woollen textiles, which are not preserved in Mesopotamia for reasons of soil chemistry. Everyone can see how far we are from the potentialities offered by the European archaeology with its new data and new methods (using MEB investigations for the determination of fibres and measurement of their diameters, and DNA research).⁷ However, within the framework of oriental research, Ryder introduced new ideas: sheep were not only for meat but also for wool, and that wool was subject to evolution (whatever the nature of this evolution).

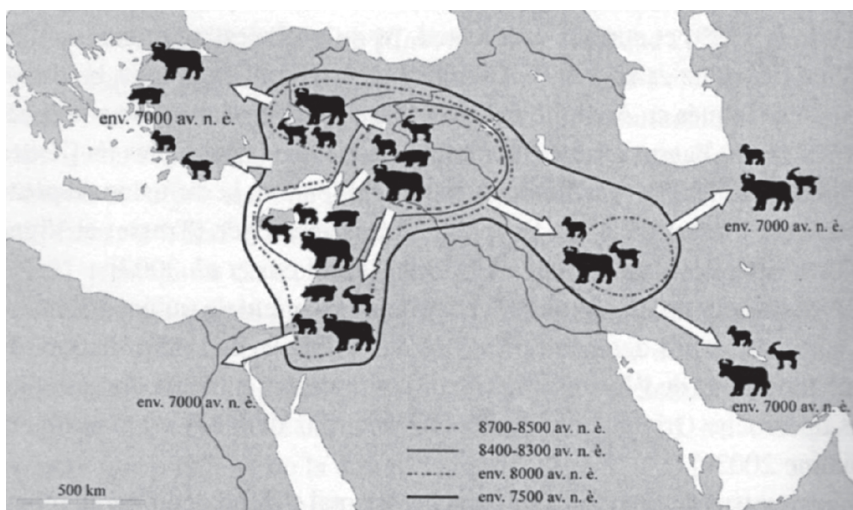


Fig. 4.1. The beginnings of animal domestication in the Near East. Adapted from Vigne 2004, fig. 4.

Three main points will be developed here: the sources which can be used, wool processing documented by these sources, and the political economy of wool.

1. Sources and history of wool

Wool is often said to be the main textile material of Mesopotamia. This needs to be reconsidered since vegetal fibres were processed long before wool, from Palaeolithic times in Europe as well as in the Near East.⁸ In the Ancient Near East, the most ancient rope traces are those from Ohalo II in Israel (c. 17,000 BC),⁹ i.e. significantly older than the string found at Lascaux. It is however difficult to assign them to a 'textile' function, although the elementary component (sometimes twisted) is present.¹⁰ Now, most scholars assume that nets or ropes constitute the basis for the invention of true weaving.¹¹

We have to draw the first conclusion from these data: wool has its own history. This should not be confused with goat hairs, as the goat's coat was not transformed by the domestication process. For the Neolithic period, flax is among the earliest plants cultivated by man along with cereals in the Levant,¹² and was the fibre are

usually associated with the great religious ceremonies.¹³ Other textile plant fibres were used (some were found at Arslantepe for instance),¹⁴ but they are less documented, and until now, poorly identified.

In order to document the history of wool, we shall now consider the original sources. At least, five different sources can be used here and need to be merged, to provide the methodological framework of this synthesis: sheep skins and woollen textiles, archaeozoology, tools for production, texts, and iconography. We must assume that it is not possible to illustrate one by another (archaeology by iconography, or iconography by texts for example). Each of them alone is not sufficient to reconstruct the history of wool in Mesopotamia.

1.1. *Sheep skins and woollen textiles: the primary sources*

In principle, skins and textile remains should be our first primary source. Unfortunately, the taphonomic conditions of the Near East do not allow us to use them as we would wish, because skins and woollen textiles have not been preserved. This is contrary to the European situation where sheep skins were preserved, at Hallstatt for example,¹⁵ offering the possibility to study the number of hairs per cm² and their diameter. No skin is known for the entire Near East until the very end of the 1st millennium BC. In the Pazyryk kurgan, frozen soils preserved organic materials, such as felt and rugs. Among the artifacts buried in the chamber, a sheep skin was found, dating to the 5th century BC.¹⁶ However, its late date means that it is not appropriate for our study of the beginnings of wool in the Near East. From the direct evidence, such a study is not yet possible even though a skin imprint on one of the Arslantepe *cretulae* has been found.¹⁷ It is hard to determine to which animal this skin belongs, but this way makes possible to see what is 'invisible' (i.e. not left) in archaeology, as suggested by Eva Andersson Strand during the conference.

Textiles rarely remain intact in Mesopotamian soils and woollen ones are usually not preserved at all, suffering from taphonomic conditions much more than vegetal fibres. Even if textiles were miraculously preserved, it is hard to conserve them in the field. For example, Woolley referred to the discovery of a red *kaunakes* textile in one of the Royal Tombs of Ur, but this unique piece of what remains an unknown fabric probably did not even reach the digging house in the 1920s! It was probably disaggregated by the sunlight and air after the opening of the grave. Most of the textiles disappeared in this way just after their discovery and, even when conservation was done, the organic sample is often hard to identify without controversy! The earliest examples do not come from Mesopotamia, but from the Pre-Pottery Neolithic layers of Çatal Höyük. As everyone knows, fire destroyed several layers of this well-known Anatolian site. This peculiar situation brought about the preservation of an extraordinary amount of organic material, from houses preserved up to the ceiling, to wooden vessels. Among these artifacts, many textiles fragments were recovered, mostly coming from burials under the soil. They were first studied by H. Helbaek who, as a paleo-botanist, was a member of the excavation's team.¹⁸ His first conclusion (among others on the technical quality of the sample) was that these textiles were mixed. His observations, using a microscope, demonstrated that some were of plant fibres, and others were of wool. A second study was conducted a few months later by H. Burnham in the Ankara museum.¹⁹ He concluded that the Çatal Höyük textiles were of wool fibres and the

lack of flax seeds in the corresponding archaeological layers gave him a scientific confirmation of his point of view. Then a third study was conducted by M. Ryder, confirming Burnham's conclusions on the presence of plant fibres, but he also drew attention to several facts: the scaly surface of some of the fibres and maybe the Z-spun direction of the worked fibres, and the presence of a nitrogenous substance (which can be the consequence of a long contact between decaying corpses and textiles in tombs, also testifies the vegetal origin of the textiles).²⁰ None of these observations was absolutely convincing in itself but it led Ryder to conclude that both linen and woollen fibres were present in the Çatal Höyük's samples. Mellaart was well aware of this debate, but carried away by his extraordinary discoveries, he talked about the possibility of mohair fibres (i.e. goat fibres) in the Neolithic layers of the site!²¹ However, the controversy on the true nature of the Çatal Höyük's fibres, flax or wool, calls for further investigation. The recent excavations on the site did not bring new direct data on textiles, but produced more information concerning archaeozoology.

The other possible examples of woollen textiles come from the Nahal Mishmar Chalcolithic Cave.²² Once again this site is located outside of Mesopotamia,²³ in the Judean hills, where a very dry climate allows the preservation of organic materials. The cave is well-known for the Chalcolithic hoard it concealed, wrapped in mats. As with the other caves of the area, the cave was inhabited through ages and the excavators found at least two main levels, Chalcolithic and Roman. Within the latter, many woollen textiles were uncovered allowing precise technical investigations of fibres, weaving and dyeing practices. By contrast, very few came from the Chalcolithic layers where linen textiles were well represented. The 'Chalcolithic woollen pieces' are now suspected to be much more recent (coming from a disturbed stratigraphy,²⁴ not recognized during the field operations). These results will probably be subject to continuing debate. Thus, we are faced with two possibilities for dating the first use of wool for weaving: the late PPNB, at the time of the introduction of domesticated sheep in the settlements, or the Chalcolithic period.

1.2. *Archeozoology*

Archaeozoology is now amongst the disciplines solicited when studying recent prehistory. It has made it possible to identify the animals, both domestic and wild, from the sites' immediate surroundings. Its introduction in the archaeological field dates back to the 1950s, when people started to study the Neolithic period and to understand that animal domestication – thought initially in terms of food – was in fact one of the main key factors: impact on the environment, heritage, search for prestige, emergence of new ways of life like the pastoral life, etc. It started with the identification of the domesticated animals. It has often been stated that goat and sheep bones are difficult to differentiate within archaeological samples. With the exception of this problem, archaeozoologists used biometric data and comparisons between domesticated and wild species. It is generally known that domesticated animals are smaller than the corresponding wild ones. Within the framework of the archaeology of the Near East, the small size of certain wild species brought some confusion for the beginning of the Neolithic period. We have learned since the 1950s that this small size can be related to the climate generated by the last glaciation period just before the advent of the settled life, or it could

simply be the expression of sexual dimorphism, and have no relation to domestication!²⁵ In order to avoid such mistakes, to reconstruct and to document the domestication process and its purposes, new criteria were added: the herd's composition (sex ratio) and the study of slaughtering patterns.²⁶ For this, archaeozoologists use theoretical models based on comparison with modern breeding practices: young animals killed for meat, older animals used for producing milk, or wool, etc. We are indebted to Pierre Ducos for being among the first scholars who insisted on the profitable value of the animals when alive. Indirectly, he contributed to the myth of the history of secondary products.²⁷

1.3. *Artifacts*

Other indirect archaeological finds could help us to reconstruct the history of wool. Specifically, if we postulate that as a new material, wool brings technological inventions, such as new tools for spinning or weaving (spindle and weights for the main categories). The major difficulty is the equivocal nature of these tools, most often found out of context. Without the discriminant parameter of context, a spindle whorl looks like a cart wheel from a clay model and weights could be fishing weights as well as weaving weights... As none of these weights were found *in situ*, it is easy to understand that no structure of production, public or domestic, is known for archaic Mesopotamia! However, the main problem is not the lack of direct data; it is the misunderstanding of the existing information. Spatial analysis is often missing or impossible to achieve for ancient excavations, because material was not recorded *in situ*, or because what is left is not sufficient. Mud-brick architecture is usually not sufficiently preserved. Ground surfaces and wall elevations are destroyed, so that we have no possibility of understanding the way, for example, that looms were attached to the ground or walls. Even where it is possible to connect some devices with weaving,²⁸ it remains difficult to link them with wool.

Finally, the scattering of these artifacts in the published literature makes the work hard. Except in the case of some exceptional recent excavations,²⁹ they are badly described, never weighed and usually not studied at all!

1.4. *Iconography*

Iconography can be used to shed some light on craft processing, or uses of textiles. Our main source of images are provided by cylinder seals. However, we must deplore the lack of renewal of iconographic studies which are still dominated by the religious paradigm. It is often said that 'ideology did not encourage the depiction of daily activity in art'³⁰ and it is clear that depictions of weaving are quite scarce. The well-known imprint on a bulla from late 4th millennium Susa, which depicted a ground loom, is among the most discussed artifacts. It was initially interpreted as a vertical warp-weighted loom, but this has been corrected by Amiet.³¹ I postulated that depictions are much more numerous than assumed, but that we do not know how to 'see' them.³² Technical details are often lost in a stylized drawing (and sometimes the artist's ignorance of weaving is evident!). But, it is hard to be confident that all the representations are linked with wool. However, iconography, as well as texts, bring nothing else than a *terminus ante quem*. The looms depicted or the workshops referred to in the texts could have existed earlier...

1.5. *Texts*

Textual cuneiform evidence is of invaluable help and usually illustrates economic aspects. It falls into two main categories: written records from large administrative units such as palaces or temples, or private families' archives. The difficulties of using them are notorious. Their context is often unknown, they are scattered in many museums and in numerous publications and need to be gathered. The terminology used in the texts is often obscure;³³ the translations sometimes need to be reconsidered. The light they shed is often very limited, chronologically speaking. But, they inform us about the animals, the way they were described and classified,³⁴ the associated breeding practices, the manufactured products, the exchanges through redistribution mechanisms or long distance trade, ³⁵and so on. They also provide a great amount of information about the weaving workshops of Mesopotamia that transformed wool into fabrics at the end of the 3rd millennium BC, during the Ur III period.³⁶ At that time, wool was an important economic material, provided by big flocks controlled by the major institutions, transformed into textiles on an industrial scale in workshops and sometimes given to the workers as 'rations'.³⁷ From that time, Babylonia started to be the 'Land of Wool', but it does not mean that this situation existed at the beginning...

Finally, we must admit that Near Eastern archaeology makes little use of ethnographical comparisons or experimentation. When they are done, these studies are limited to a description of the technical process. For instance, in the 1980s, Ochenschlager made a survey of sheep breeding practices and spinning/weaving activities in the Iraqi marsh lands.³⁸ Even though he examined the general organization of the handicraft from an ethnological (rather than ethno-archaeological) point of view, it is hard to consider that his conclusions are relevant to ancient times, as the social structure and the historical context are quite different. A more accurate approach is developed by Eva Andersson Strand as she focuses on technical criteria within the framework of an experimental approach.³⁹

Let us now turn to the wool processing. As a technical process, we can hope to document it through this combination of different resources.

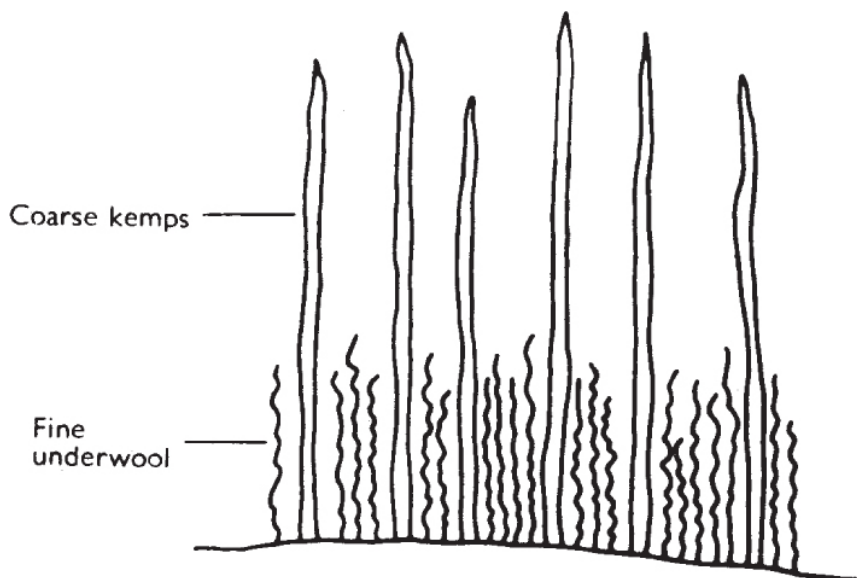


Fig. 4.2. The coat of wild sheep. Redrawn from Ryder 2007, fig. 1.8.

2. Archaeology of wool processing and the ‘chaîne opératoire’

2.1. From wild mouflon to domesticated sheep

It is now accepted that the wild ancestor of the domesticated sheep is the red mouflon, *Ovis orientalis*, which originated in the Fertile Crescent, and in the Taurus piedmonts.⁴⁰ Between the 1950s and the 1980s, some doubts were expressed on this conclusion as several sheep species are present in this area, as well as in Europe, but the progress of chromosome analysis has shown that most of the sheep, interpreted as wild, are in fact runaway animals.

It is accepted that this wild ancestor was not domesticated for wool, for wild sheep have none. Its coat was made of two types of fibres: long and straight kemps protecting the animal against the rain that covered a fine short underwool (Fig. 4.2). This underwool moulted once a year, in spring. A first genetic shift, as a consequence of the domestication process, amplified the growth of this underwool. The second genetic shift was the continuous growth of this woolly fleece, and this occurred between the Bronze and the Iron Age in the Near East.

The transformation of this underwool into wool had been fully theorized in the 1980s by Ryder who followed the work of Hilzheimer in the 1930s who is also known for having studied the faunal assemblage from Tell Asmar in the Diyala.⁴¹ Ryder’s work focused for the first time on wool, as already stated. Previously (and until now), many scholars even in the archaeozoological field, thought of sheep in terms of meat,⁴² and not wool, driven by the idea that man domesticated nature as a response to environmental pressure. Since the 1980s, scholars considered new ideas such as cognition or prestige to explain this major shift, the advent of subsistence economy, in human history.⁴³

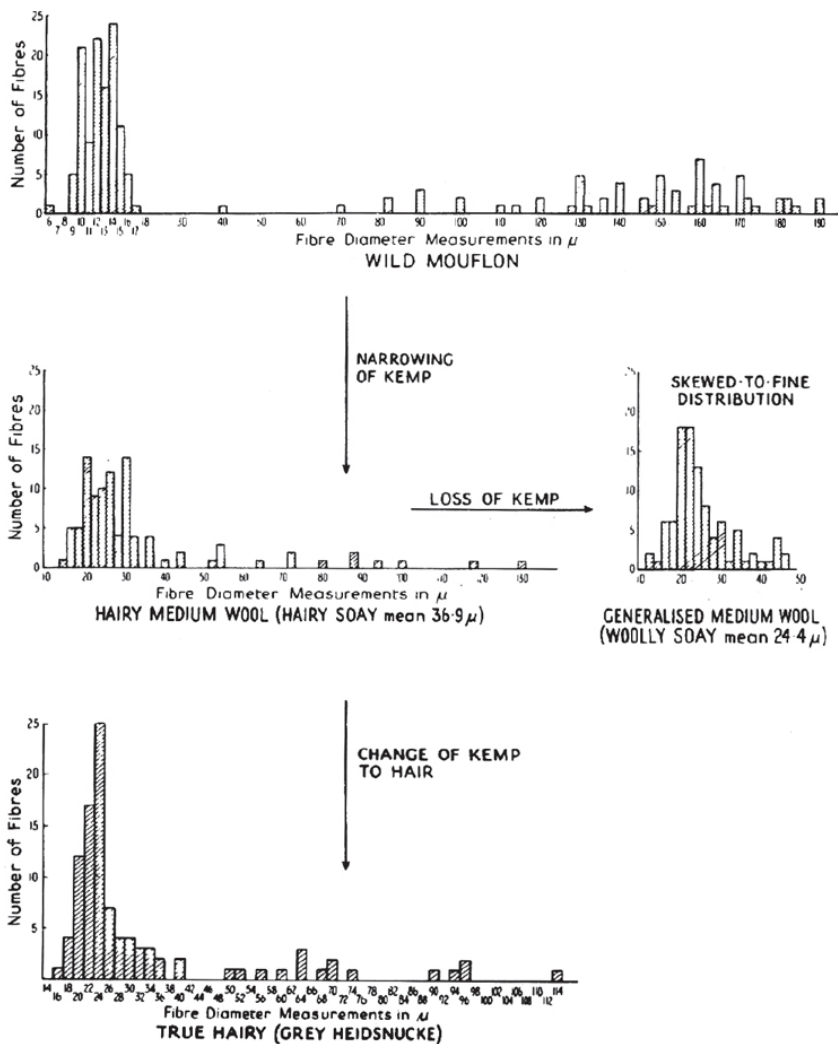


Fig. 4.3. The supposed evolution of sheep fleece. From Ryder 2007, fig. 3.36.

However, for the Near East, Ryder's theoretical model could never have illustrated the archaeological record because of the complete lack of archaeological samples. Ryder tried to circumvent the problem by two ways. Firstly, reconstructing the process with a very linear point of view, assuming that man selected sheep for fine wool only and, secondly, by the use of iconography. He isolated 3 main steps which remain purely theoretical (despite the fact that some hypotheses were drawn from the examination of feral sheep such as the Soay): wild (i.e. no wool), a hairy medium type with little wool in the form of staples, a hairy type (kemps became wool).⁴⁴ The final step of this lengthy selection process was a fleece of fine wool (Fig. 4.3). Generally speaking, the first Near Eastern domesticated sheep (Neolithic and Bronze Age) were 'hairy', but we know that

different qualities of hairs can be found in different parts of the same animal,⁴⁵ meaning that fleeces are mixed. Ryder's model was criticized and improved by specialists of European textile archaeology on the basis of the examination of archaeological skins with fleeces and woollen textiles from the salt mines of Hallstatt. Wool measurements (density, diameter) brought to light at least four mixed types (kemp, fine or coarse underwool).⁴⁶ What is relevant in these conclusions is the impact of human choices on wool production and processing. Since at least the Bronze Age in Europe, the selection of wool for textiles was made within mixed fleeces, and not only from woolly sheep. Unfortunately, our Near Eastern evidence cannot produce the same conclusions. We can only postulate that man selected sheep for different purposes: for meat and milk in the case of mixed husbandry, for aesthetic choices that required much larger or coloured fibres (and we can postulate that sheep with white, brown, black and mixed colour fleeces existed), for carpets for which resistant wool is needed, for felt too, for fur. It means that unless skins and textiles are considered, it is more or less impossible to reconstruct the nature of domesticated fleeces...

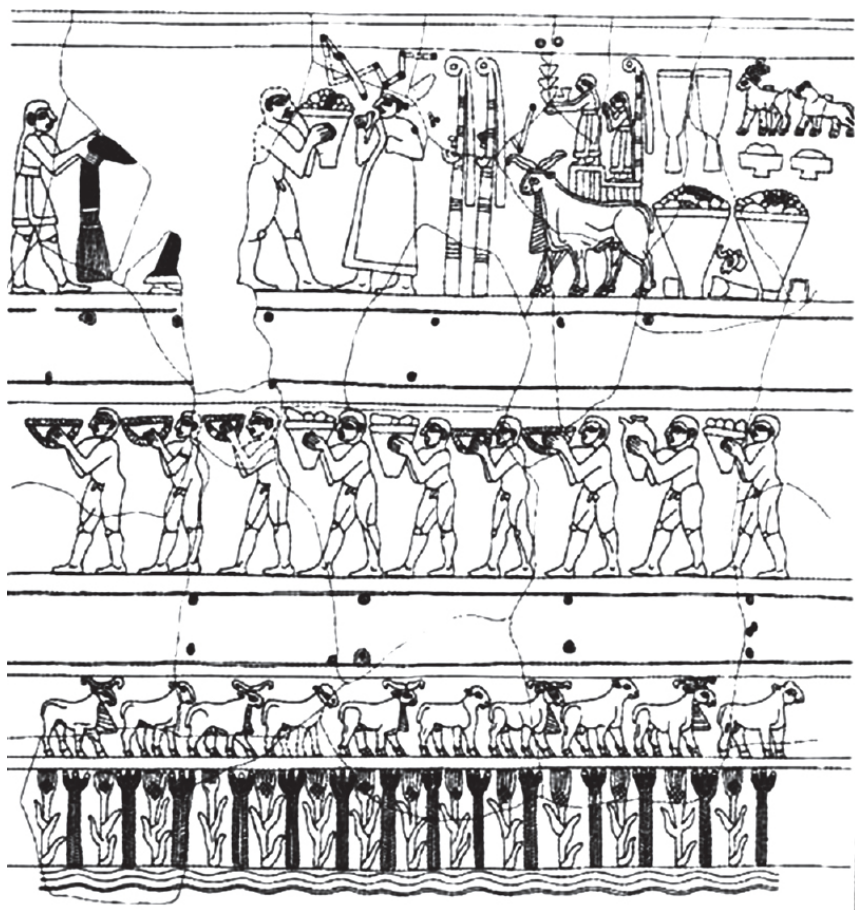


Fig. 4.4. Vase of Uruk, c. 3000 BC, now in the Iraq Museum, Baghdad. From Lindemaeyer and Martin, 1993, Taf. 39.

Ryder also used iconography to confirm his theory. As the model was purely theoretical, iconography provided direct but debatable proof.⁴⁷ He tried to correlate the different steps between wild fleeces to the finest domesticated ones. Some artifacts provided images of domesticated sheep with early characteristics. For example, sheep depicted on the Uruk vase (Fig. 4.4) seem to have a short coat, twisted horns for male (none for ewes), 'jabot' and short tail. These sheep were known as hairy sheep. But for other objects, more stylized and more ancient, the supposed proof is subject to debate. For instance, his medium type (coat becoming hairy with staples) was supposedly illustrated by the sheep figurine from Tepe Sarab whose drawing was very schematic. A second drawing, done much later and in a more realistic manner, shows that this intermediate sheep was more probably a goat... for it has drooping long ears, long kemps and goatee (Fig. 4.5)! ⁴⁸

The so-called secondary products revolution paradoxically obscured the debate. This was developed by A. Sherratt when scholars thought that the first domesticated animals of the Neolithic were bred for their meat.⁴⁹ For him, the systematic search for milk, wool and transport could not appear at the same time and required a few centuries or even millennia of adaptation, as he placed his second revolution during the 4th millennium BC. This revolution was linked to the urbanization process and the increasing social complexity of the first Mesopotamian states. Iconography, which appeared on a large scale at the same time, provided evidence of this second use of domesticated flocks and the change in subsistence strategies. Sherratt was followed by many archaeozoologists. However Greenfield offers a more subtle point of view, reasoning in terms of the scientific selection of data (some data are definitely ignored) and using recent information from new sites.⁵⁰ Since 1990–2000, coherent evidence for the use of milk and wool were brought to light in Iran, Anatolia and middle Euphrates' Syria as early as the PPNB.⁵¹ This includes an increase of the ovicaprids' exploitation, slaughtering of adult animals, even if the basic exploitation remained diversified, etc. Specialists also pointed out the fact that a bigger sized sheep was introduced during the Halaf period (6th millennium BC) but it is hard to correlate this change (scientifically speaking) with the specific demand for wool.⁵² But, what seems to be clear now is the fact that people started to 'manipulate' their livestock at an early date, from the end of the PPNB period and started to use (rather to exploit) animal fibres on a small scale. As wild sheep have no wool and as we do not know how long the process took that brought about the coming of wool, it is hard to imagine what people exactly did and for what reasons. Another step in this development came with the specialized and institutionalized economies of the first cities where wool became prominent.⁵³ These soft conclusions reconcile the two starting hypotheses of Sherratt and Greenfield!



Fig. 4.5. The so-called sheep from Tepe Sarab. From Breniquet, 2008, fig. 16.

2.2. Southern environment and flocks

Within the framework of this specific problem, we must deplore the state of the research on southern Mesopotamia. Some factors tend to suggest that this area could be another place for a local Neolithic process. As far as we know, i.e. from the results of the excavations at Tell el'Oueili,⁵⁴ man settled in southern Mesopotamia from at least 7000 BC, and probably much earlier. The site revealed

the most ancient levels known in the area (called Ubaid 0). A deep sounding has shown that an older settlement is present at the bottom of the stratigraphy, unfortunately sunk in water and impossible to reach. We do not know yet the depth of the virgin soil. But what is clear is that the southern plain was settled at an early stage without being indebted to people coming from central Mesopotamia for its colonization. Since that time, man was farmer and stockbreeder, but we cannot explain how and when the complete process emerged. We know there were some Palaeolithic settlements in Arabia but the link between them and the first Neolithic sites is lost. Geomorphologists tried to gather some data on the natural formation of the Tigris-Euphrates' delta. These researches,⁵⁵ combined with the examination of the Corona photographs conducted recently by J. Pournelle,⁵⁶ show that the process is difficult to understand precisely. Around 18,000 BP, the Persian Gulf didn't exist and the two rivers flowed through a hilly landscape down to the Oman Sea. Water filled this area when the last ice melted, while their own alluvial deposits tended to fill progressively their corridors. Ancient settlements are now completely submerged under water or under the alluvial deposits and the only ones we can reach are those settled on 'tortoise backs' like Tell el'Oueili, surrounded by marshes. Moreover, the natural setting around 3000 BC is a mixture of marshes, surrounded by steppe areas suitable for irrigated fields and sheep grazing (and this corresponds to the introduction of the fat-tailed sheep and new pastoralist practices). Large irrigation systems, linked with exchanges and fluvial traffic, appeared as a consequence of this changing environment during the 3rd millennium. Even if we admit this probable scenario, the lack of evidence on wild animals and crops present in the area and the nature of the first settlements makes it impossible to draw conclusions about the existence of a local Neolithic process. In other words, we have a very limited knowledge of the domesticated sheep present there since the Ubaid... What we know is that sheep were less well represented than cattle and pigs at Oueili. Such a situation might be explained in two opposite ways. Firstly, we could think that sheep were not present in the village but driven to the faraway steppe by nomadic or transhumant groups.⁵⁷ Secondly, we might conclude that the area was not suitable for sheep breeding before the end of the Ubaid period. Both, the advent of a new environment and the development of chiefdoms where animals were considered as wealth⁵⁸ could be the two keys to understanding what really happened.

For the following Uruk period, some scholars identified *bullae* with their tokens as records of small flocks of sheep entrusted to shepherds.⁵⁹ Nothing supports this hypothesis, although shepherds did exist at that time. They were probably specialized workmen, appointed by the 'authorities' (temples or palaces), and not nomadic tribes.⁶⁰ They led sheep to distant grazing lands. This could be confirmed by iconography, as shepherds and their flocks are often depicted in iconography (Fig. 4.6) ⁶¹. We must notice also that a fat-tailed sheep appears in the iconography for the first time in the Uruk period (Fig. 4.7). This particular fact can be understood as the result of a major change in flock management characterized by the use of distant grasslands, as space would have been needed to maintain an increased number of sheep. The fat-tail acts like a camel's hump, a stock used in an arid environment. The southern situation is quite different to that in north Syria where pastures surrounded the cities like Ebla, al-Rawda, etc. and where flocks were quite numerous. A flock of about 1,400 sheep (belonging to the city and not

provided by nomadic groups) is recorded in the archaic texts of Uruk. This quantity seems small compared to the 80,000 sheep flock of Ebla a few centuries later!⁶²

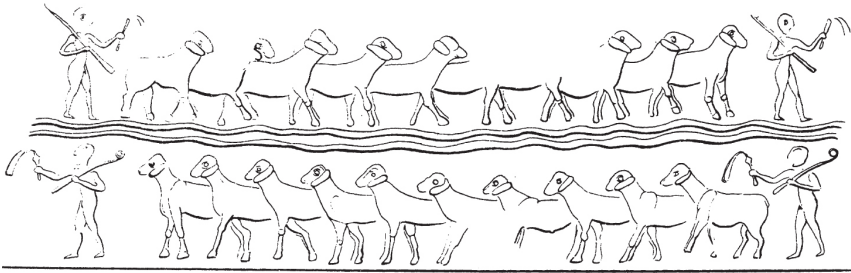


Fig. 4.6. *Imprint of a cylinder-seal, Uruk period. Shepherds and their flocks. Redrawn from Amiet, 1980, GMA 614.*

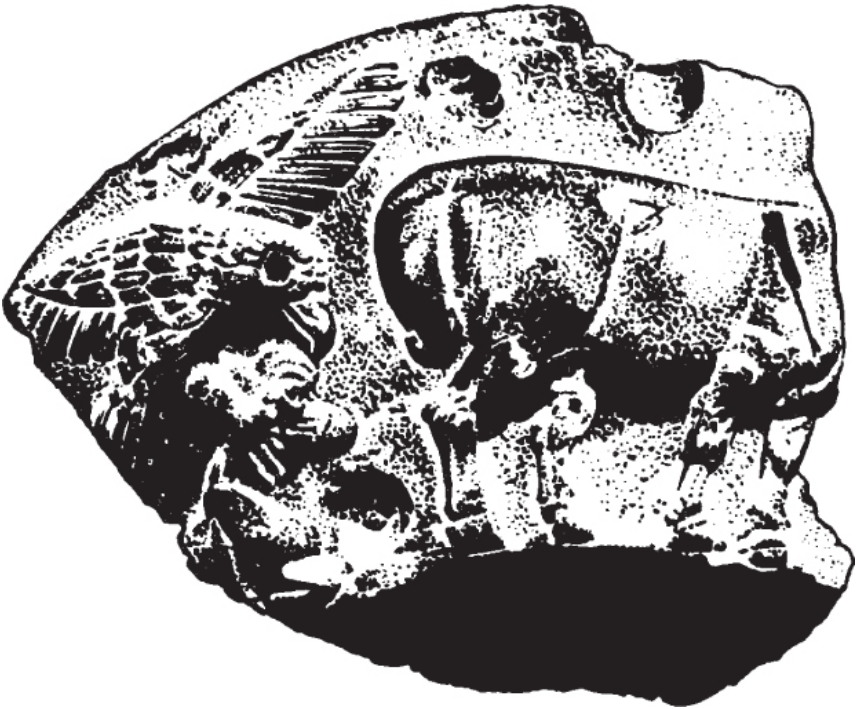


Fig. 4.7. *Fat-tailed sheep on a stone bowl from Uruk III, c. 3000 BC. After Ryder 2007, fig. 3.6.*

2.3. *Sheep and wool*

What is certain is that sheep were not sheared but plucked once a year,⁶³ as they lost their hair naturally, like dogs and angora goats. It has been supposed that plucking could have been performed with the help of a flint scraper.⁶⁴ This hypothesis remains quite uncertain as no specific mark can be recognized on the tool (and I'm not sure that anyone ever tried to find one!). People could use a

wood or bone knife or pluck with their hands. It has also been suggested that this tool could have been used for shearing sheep. This remains hazardous because the continuous growth of the wool required a genetic mutation that is not attested to before the end of the Bronze Age or the very beginnings of the Iron Age in the ancient Near East, but the exact date of this mutation is not clearly determined. It is difficult to say if sheep were washed before shearing at that time or not. The annual moulting does not allow for this operation because of the loss of fibres. It was much more convenient to wash the wool than the sheep in the early periods.⁶⁵

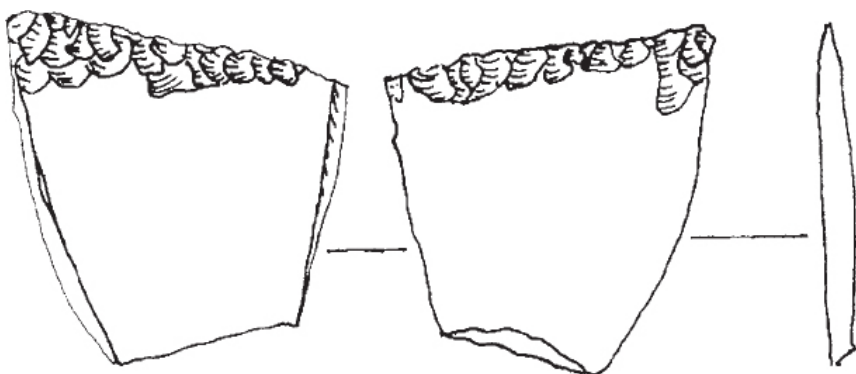


Fig. 4.8. Flint scraper 2.5 cm long. Redrawn from Copeland 1996, 338, fig. 4.18 no. 1.

Written records from the very beginning of the 3rd millennium and for the Ur III period show that 3 to 5 major categories of sheep were recognised by the people of Mesopotamia themselves. These combined different criteria involving age, sex, origins, uses: with or without fleece, long or short hairs, upright or lop ears, coloured hair, with or without spiral horns, with thin or fat tails, etc.⁶⁶ Some of these types can be recognized in the iconography,⁶⁷ suggesting that woolly fleeces were quite uncommon and probably remained an unusual fibre until the 3rd millennium BC. According to the texts, the best quality, white wool came from the fat-tailed sheep and was reserved for the king. Mountain wool appears to have been of a lesser quality and the wool from Drehem, even worse.⁶⁸

Hilzheimer and Ryder used iconography as a method to validate a preconceived idea. They used these depictions as if they were photographs, without thinking in terms of the artistic conventions used to depict sheep and goats with the same stereotype.⁶⁹ It was never clear in the writings of Hilzheimer or Ryder whether or not the absence of fleece on the images proves the complete lack of wool or if wool was collected.

Wool is a light material, easy to transport if put in containers like bags, perfect for exchange. Everywhere in the world, wool is stored in bundles. K. Szarzynska convincingly recognised bales or bundles of wool in some Urukian pictograms.⁷⁰ These bales of wool were stored but although we know the existence of some storehouses, it is impossible to say if they contained wool or some other goods, or both. The most intriguing is the É-siki of Ebla, the 'House of Wool', thought to be either a workplace or storehouse, which refers metaphorically to a storeroom for gold and silver.⁷¹ Unfortunately, this place has not been found by the excavators! During the proto-dynastic period, at the time of the first conflicts, it is tempting to

recognize the looting of bales of wool on the Standard of Ur (Fig. 4.9).



Fig. 4.9. Standard of Ur, now in the British Museum, London, ED III, Peace panel, lower register. The looting of woolpacks? Drawing by the author.



Fig. 4.10. Weighing the wool? Redrawn from Matthews 1997, nb 218.

As far as we know, the quantity of wool produced per sheep is less than one kilo. As Mesopotamia didn't have a true monetary system in its early times, weighing played an important role. We know of at least one specific inscribed weight for wool which was suspended on a chain.⁷² Some depictions could illustrate this operation (Fig. 4.10), although many other goods were also weighed.

2.4. Making the yarn

In order to organize the wool fibres for spinning, it is necessary to untangle the fibres and make them parallel to each other. This can be done by combing or carding. No wool comb has been identified by archaeology, although they appear in texts in the Old Babylonian period, and true 'carding' is not attested in early periods⁷³ and so it would be better to avoid the use of the word 'carding' in our contexts.⁷⁴ In a traditional context, craftsmen often prefer to proceed by stretching the wool by hand. The objective is to prepare a band which will be wound onto the distaff. It could be that the stretching of the wool is in fact depicted in some of the so-called banquet scenes, where one sees people around a vase with straight pipes emerging from it. In many cases, the pipes are not pointed in the direction of

people's mouths (Fig. 4.11).⁷⁵

Usually, clean wool is put away in a basket, the greek *kalathos* or a vase. We do not know of any Mesopotamian *kalathos*, but during the Uruk-Djemdet Nasr times, a pictogram, in association with the meaning 'spindle', seems to evoke the concept or the possible existence of the spinning bowl.⁷⁶ We must recall that Aegean archaeology used the term *kalathos* by analogy with the shape of this basket to name the pots, known in huge quantities because they were mass-produced on pre-industrial basis like our bevelled-rim bowls!

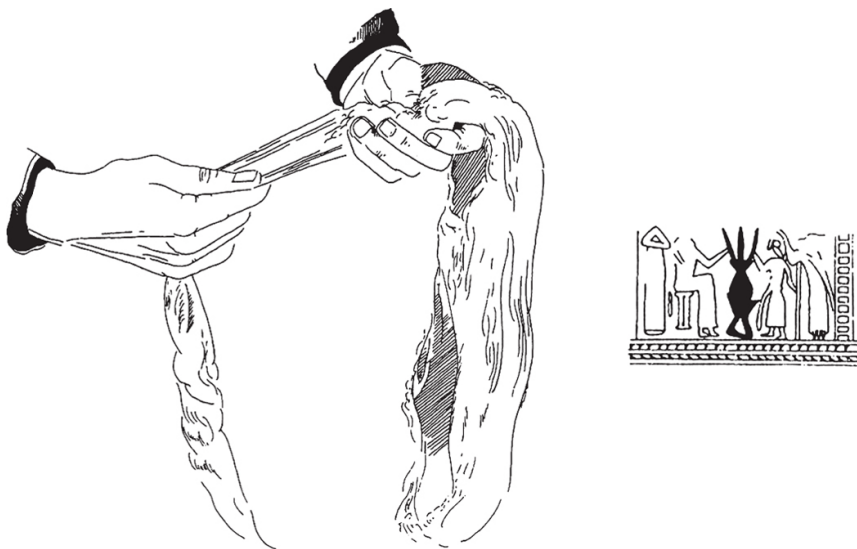


Fig. 4.11. *Stretching the wool.* Redrawn from Matthews 1997, nb. 511.

Wool is not the first fibre to be used for textiles. Plant fibres were used first. Coming from the stalk or from bark, they are long, and easy to transform. They can be spliced together by hand, and no specific tool is required. In the beginning, people probably used no spindle at all. They proceeded by hand, rolling the fibres on their leg or through their fingers, or even spliced two long fibres together in order to obtain a yarn as long as possible. Flax or plant fibres are 'long' and straight. By contrast, wool fibres are short and delicate, and even though their surface is scaly, it is hard to join them to make a thread. Their processing is probably led to the introduction of a new material and new techniques: the spindle, the spindle whorl and the distaff (what is called the 'suspended spindle').⁷⁷ The distaff holds the wool; the spindle and its weight stretch and twist fibres simultaneously. The spindle is pulled towards the ground by the weight of the whorl as the thread is made (Fig. 4.12). Most antique distaffs are hand-distaffs (they do not look like the long ones seen in Europe since medieval times). No distaff is known in Mesopotamia, except those in metal, stone or ivory coming from Bronze or Iron Age levels.⁷⁸

This new technology could have diffused to plant fibres later. The difference is the weight of the spindle whorl: probably initially heavier in the case of flax, able to pull the spindle down, and much lighter in the case of wool, suggesting that

spindle, weights, or imprints on plastic materials like bitumen, clay or plaster need to be studied on typological and morphometric grounds.⁷⁹ This seems coherent with archaeozoological data. The increasing number of spindle whorls at Tell Sabi Abyad at the end of the 6th millennium BC is consistent with the increase of ovicaprids' bones and the practice of slaughtering adult animals.⁸⁰

With this new technology, a spindle, manipulated by a right-handed spinner would create a Z-spun thread, with the distaff held by the left hand. It has often been said that Z is the most frequent spinning direction for wool.⁸¹ However, it is hard to use these criteria as absolute ones. We must keep in mind that heavy spindles could have also been used for plying vegetal threads and we must regret that this operation is less well documented by experimental archaeology than true spinning. Spinning bowls with double or triple loops inside them were identified at Habuba Kabira and in Palestine, but their use remains obscure. They could have been used to ply two or three threads together, each one passing through the loops, or simply have been wetting bowls.⁸² For the very short and fragile wool fibres, people can use a bowl in order to facilitate the spinning process, with a suspended spindle, to prevent the thread from breaking, as it is possible to observe in South America. Despite the controversy which surrounded the Ubaidian boat model from Eridu reinterpreted as such a bowl, this technique is not attested in the ancient Near East.⁸³



Fig. 4.12. Making the thread, the two methods. a: for the vegetal fibres; b: the suspended spindle (simultaneous stretching and twisting). From Barber 1991, 47, fig. 2.9; drawing by the author.

When spun, the threads are transformed into skeins in order that they could be kept clean and easy to store. This step is clearly shown on the well-known proto-dynastic standard of Mari.⁸⁴ But it is difficult to link this scene specifically with

wool (and not flax) processing. Wool could also have been dyed.

2.5. Dyeing process

Fibres have their own natural colour and wool especially in early periods ranged probably from brown to black. Wool is easy to dye because of its scaly surface which allows the dye to go deeper in the fibres, and white wool is the best candidate for dyeing. As no textile has survived and as colour has often disappeared from archaeological material, it is hard to get a good overview of the use of colours. Red threads are recorded in Neolithic contexts⁸⁵ and the archaic texts from Uruk mention coloured fabrics (white, black, yellow and red).⁸⁶

The first dyes of the Neolithic period are probably vegetal. Generally speaking, dyes are all badly documented by Near Eastern archaeology, primarily because of the lack of textiles. Animal dyes are often restricted to the purple dye, produced by murex on the Levantine coast. We know of other sites for the production of another kind of purple given by the *Thais savignyi*. In the Late Bronze Age, at Khor, in the Gulf, shell middens and fire structures seem to be connected with this industry.⁸⁷ A possible workshop for dyeing has been excavated in Mari in the Early Bronze Age: it consists of a vat coated with bitumen but no fire installation was found with it.⁸⁸ If this hypothesis is correct, the vat was used for directly impregnating the wool, threads or fabrics with the coloured dye diluted in the water.

2.6. Making the fabric

The remains of weaving installations are scarce, not found because usually they are not preserved or not recognized. Moreover, it is always difficult to associate them with wool. The only textile that was clearly made of wool is felt and this requires no specific device at all! But felt is not part of the prehistory of weaving: it requires a large amount of raw material and probably a specific kind of resistant wool.⁸⁹ There is nothing to demonstrate that these were the characteristics of the early wools.

Let us explore this in another way. Weights, discoid or elongated in shape, are numerous in Ubaid contexts but usually come from the surface of the sites. It is easy to observe that their shapes are varied and do not evoke the standardized shape of the well-known pyramidal loom weights. But this shape appears later in History, around the Iron Age. Due to the proximity of the marshy landscape, these Ubaidian weights are usually interpreted as weights for fishing-nets, without further arguments. Weaving wool is influenced by the characteristic microscopic scales on the fibres. For this reason, it has often been observed that the warp-weighted loom is closely associated with wool, even if it was later used with flax. The warp-weighted loom, with its beam supported by two vertical uprights, uses weights to give tension to the warp threads and the weft is woven starting from the top of the warp: wool is perfectly suitable for such an exercise as its scales prevent the weft threads from sliding down. Studied on morphometric grounds, loom weights can give an idea of the diameter of the weaving threads and on the quality of the fabric.⁹⁰ For southern Mesopotamia, nobody will be surprised to know that this study still needs to be done!

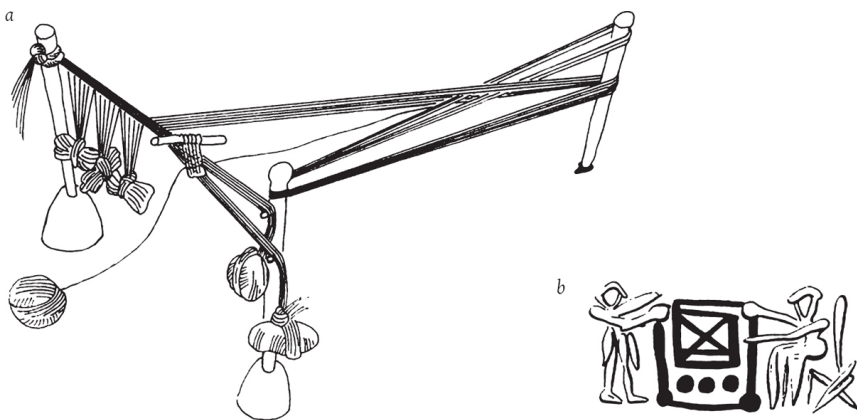


Fig. 4.13. Warping loom. a: the device used to make the starting border; b: imprint of a protodynastic seal from Khafadje. Redrawn from Amiet 1980, GMA 1340; drawing by the author.

2.7. Elusive looms but indubitable proof

A warp-weighted loom could indeed be seen as an invention for wool, but in any case, this invention should not be understood as a common instrument. Others looms, such as ground looms, simpler in conception, size and handling, might have existed. But, in order to weave on the warp-weighted loom, craftsmen invented a very original device: a warping frame. Warping consists of weaving a starting border on this small loom. The warp is held between two sticks and the weft is tied to a third peg some distance away. When the starting border has been completed, the weft is rolled into small balls. Warping the loom consists of sewing the border on the upper beam; the balls of weft are unwound in order to attach the weights. The border's weft becomes the future fabric's warp! We have few depictions of such an operation in the iconography of Antiquity. Usually people work two by two, the one weaving the border is seated, the other stretching the weft to the third stick stands. Isn't this what we have on this protodynastic cylinder-seal from Khafadje (Fig. 4.13)? Another proof comes from the presence of a knot on the skirt of the attendant on the Uruk vase, at the junction of the two main borders (starting border and vertical selvage) (Fig. 4.14). This knot is made by the threads coming from the starting border which were used to secure the starting border to the beam.

The warp-weighted loom is nevertheless a complex tool. By using the threads' reserve rolled around the weights, it offers the possibility to weave longer fabrics. From the Uruk period to the Old Babylonian one, the *drapé* of the royal garment becomes longer and longer. For this, the loom has a special device (a sort of key), preventing the beam from rolling. It is clearly depicted on the cylinder seal from Tell Brak, on the top left of the hatched motive (Fig. 4.15).



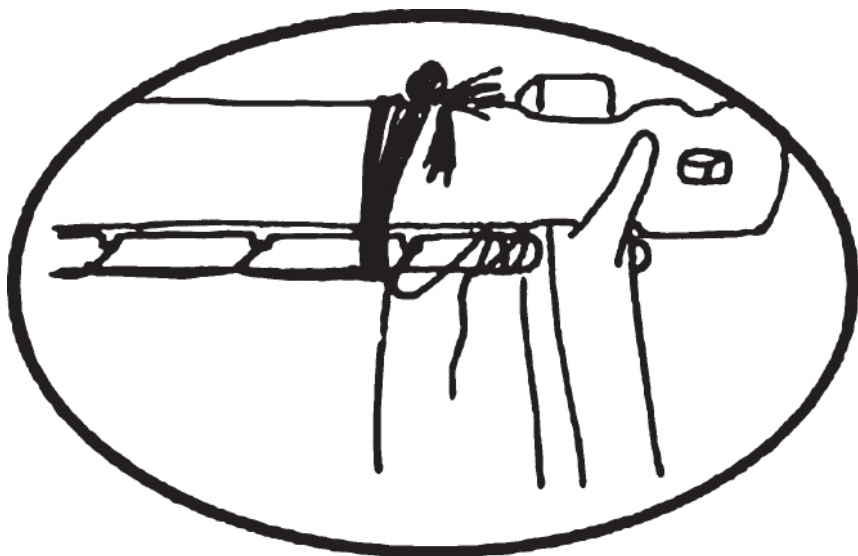


Fig. 4.14. Detail of the upper register of the Uruk vase, c. 3000 BC, Iraq Museum, Baghdad, showing the stop knot on the skirt at the join between the side border and the horizontal border, and technical explanation. Photograph and drawing by the author.



Fig. 4.15. SC Brak Redrawn from Matthews 1997, nb 508.

By using different heddle bars, it is possible to create fabrics in twill weave. Inspection of the archaeological record tends to prove its existence from 3000 BC in Anatolia. Many cross-hatched depictions of clothes such as the skirt worn by the 'Figure aux Plumes' from Tello suggest that they were twill-woven. Contemporary imprints of twill on clay were found at Alishar.⁹¹

2.8. Workshops

Looms are elusive, and this can explain why, in the Mesopotamian field, workshops are so scarce. As stated previously, it is hard to find unambiguous traces of weaving activities in buildings, domestic or official. Several mechanisms might explain this situation. Soils are often eroded, or badly excavated; elevations

didn't exist anymore, etc. We do not know how to recognize the installation in mud brick architecture: we would need to look for holes in the ground and even holes for pegs on the walls (which would require good preservation of the architecture) rather than for constructed looms. A possible warping loom has been excavated at Tell el'Oueili.⁹² Weaving looms were not necessarily permanent: a loom that has been dismantled is just a bundle of pieces of wood (see the Nahal Mishmar's for one example).⁹³

For historical periods, some scholars have tried to identify the Northern Palace of Tell Asmar as a site for textile manufacture, but this identification is unproven. It was based initially on the discovery of a tablet in the upper layers which covered the building, but direct stratigraphic links are missing.⁹⁴ If we can accept the idea that some weaving devices could have existed there, none were found during the excavations. The building is much more a prestigious residency than a workplace suggesting the *Manufacture des Gobelins*.

The most interesting hypothesis is that all of the steps in processing, from the spinning of thread to the weaving of textiles, was scattered in the settlements and that weaving on a loom was not common nor widely distributed in early periods. Complete evidence is lacking, but in order to overcome these peculiar constraints, it is necessary to interpret the whole process in a different way.

3. Political economy of wool

Wool and woollen products seem to have played an important role in the Mesopotamian political economy. But, in order to understand it, we must turn to comparable cases, since its archaeology is quite elusive. The place of clothes in the Inca empire, remains the best 'model' to illustrate part of the invisible mechanisms we are looking for. There has been a masterly study by John Murra on the basis of archaeology, history and ethno-historical archives.⁹⁵ It needs to be understood within the framework of the theoretical comments of Karl Polanyi or Timothy Earle and Terence D'Altroy on 'primitive' economies.⁹⁶ It is necessary to admit that a 'model' is a heuristic construction, not a substitute. In this study, Murra has shown convincingly that fabrics or clothes were among the major economic drivers of the State. In the Inca example, people received from the authorities the right to use wool fibres in return for a tax paid in fabrics. These fabrics were redistributed to workmen, to the army, to the officials who were paid in kind. The most ornamented textiles were offered to the prince. This well-known mechanism is the consequence of the evolution of local chiefdoms in a typical case of 'pristine' state. Wealth is based on staple finance coming from agriculture, husbandry and handicrafts. It needs important means of transportation and storage. By contrast, wealth finance is a different system in which prestige objects or currencies take the place of agricultural products, and must be exchanged within the framework of a market economy.

In order to document the Mesopotamian case, we must keep in mind that woven woollen fabrics were certainly not widely used from the time of their invention. From the Uruk period, representations of clothed characters are extremely rare. The vast majority of representations, prior to the Uruk period, largely show naked individuals. The question should be posed in terms of cultural, technical and aesthetic choices. Fabric was invented by groups that favored rudimentary clothing, associated with considerable ornamentation on body. All the examples of

the first woven woollen clothing correspond to positions of power. They are worn by dignitaries, Priest-Kings and their acolytes, goddesses and priestesses, whilst the men who present the offerings are naked (Fig. 4.4). The woven clothing is a symbol of status and power. It is no doubt the 'high tech' status and visual effect produced which imparted these properties to the fabric. The fabric may be decorated within its structure using elaborate weaves (like twill) or various colors, or even sewn ornamentation like feather or wool staples (in the case of the so-called *kaunakes* worn by all the dignitaries who received it probably from the authorities). This link between society's elite and fabric is embedded in the manipulation of the environment which accompanied the emergence of chiefdoms. More specifically, in Mesopotamia, there is no doubt that it was the development of sheep farming, in the second half of the Ubaid period, which triggered the process,⁹⁷ within the framework of a major environmental change.

To document this, we must try to link information from texts, archaeology and iconography, and Murra's depiction of a different area sheds light on our case.⁹⁸ Spinning was probably performed by ordinary people in the domestic sphere (probably women, but reliable evidence is lacking). They could spin for the *oikos*, or already have been making yarn for the authority as tribute. Were flax and wool – or only wool – involved in the same mechanisms? It is not possible to answer, nor to know if wool came from their own sheep or if sheep belonged to the community or to the authority (chief, king, etc.). This authority probably took back the yarn when spun and maybe also basic fabrics that did not require specific tools or specialized knowledge (for instance needle-made fabrics which are always underestimated). Specialized handicraft appeared at the latest during the Uruk period. Several categories of workers were attested:⁹⁹

- Women (pig-tailed ladies often depicted while weaving and churning). They could be ordinary people as well as ladies of high lineage weaving for their kin. These fabrics were probably distributed during social ceremonies as they conveyed a high identity value. They could also be nuns, members of the *arua* institution, weaving for the temple.¹⁰⁰ It is not clear whether the *arua* existed from the Uruk period as an official workshop is recorded,¹⁰¹ or started in the 3rd millennium BC. Whether they wove wool or flax is not documented... Obviously, we can also postulate that women from the *arua* were high born ladies when the institution started.
- Men wove too, probably on big vertical looms (warp-weighted and two-beam looms attested by iconography).¹⁰² In the texts, they are often recorded as master weavers.¹⁰³

But how can we be sure if we are seeing the origins of the great manufacturing period of Ur III? These productive workplaces appeared during the proto-dynastic period. They are linked with two facts: the war, which brought huge number of prisoners who must be occupied, and the impoverishment of a large part of the urban population which no longer had access to the land and was obliged to work to live.¹⁰⁴ In others words, the origins of the great workshops are not only a matter of linear evolution, but also of historical context.

Wool had uses other than for clothing.¹⁰⁵ It can appear sporadically as offerings for the gods,¹⁰⁶ and was also used as a currency within the framework of an internal ration system during the first half of the 3rd millennium BC.¹⁰⁷ Workmen received their 'salary' (in fact the exact term should be an allocation) in barley, oil, fabrics and in a small quantity of wool. The kinds of fabrics involved in this payment are unknown but one might expect that their quality was not the best. The wool was probably not spun into yarn but exchanged within the framework of

a rudimentary market. We do not know what the counterpart was. Wool appeared also in longdistance exchanges.¹⁰⁸ Two tons of wool were sent to a chief living in the Gulf area showing, in that case, that wool remained inside the group formed by political elites, who may be redistributed it locally. In Mesopotamia, wool had all the functions of a 'primitive' currency: a unit of account, standard of value, means of exchange, reserve of value, even if it stopped to be used in that way during the 3rd millennium BC. Other currencies did exist in the same time, such as silver or barley. But wool and woollen products had another dimension. They were embedded in social relations, especially kinship relations, so they could be manipulated by the power on invisible grounds.¹⁰⁹ Flax never had these uses.

It is enough to conclude that archaeology alone cannot write the history of wool in Mesopotamia. It remains silent on the main mechanisms that led Mesopotamia to become the 'Land of Wool'. Wool was an uncommon raw material, and its quality remains poor until the 3rd millennium. It was controlled and manipulated from at least the second half of the Ubaid period. Linking the recent prehistory of ancient Mesopotamia with the 3rd millennium up to Sargon's conquest, sheds a coherent light on the originality of its early history that was closed to other pristine states. This initial development is quite different to that of later periods when social classes of free craftsmen exist. The wool revolution should be understood in this way, rather than in terms of economic benefits.¹¹⁰

Abbreviations

AJA American Journal of Archaeology
 ARM Archives Royales de Mari
 AUWE Ausgrabungen in Uruk-Warka, Endberichte
 IEJ Israel Exploration Journal
 JNES Journal of Near Eastern Studies
 OIP Oriental Institute Publications
 RAAO Revue d'Assyriologie et d'Archéologie Orientale
 SAOC Studies in Ancient Oriental Civilization

Bibliography

- Akkermans, P. and Schwartz, G. (2003) *The Archaeology of Syria, from Complex Hunter-Gatherers in Early Urban Societies (ac. 16,000–3000 BC)*. Cambridge.
- Amiet, P. (1980) *La glyptique mésopotamienne archaïque*. Paris.
- Amiet, P. (2002) A la recherche d'un modèle explicatif de la 'révolution urbaine': le rôle des nomades. RAAO XCVI, 97–102.
- Andersson Strand, E. (2013) The textile *Chaîne Opératoire*: Using a Multidisciplinary Approach to Textile Archaeology With a Focus on the Ancient Near East. *Paléorient* 38, 21–40.
- Andersson, E. et al. (2010) New Perspectives on Bronze Age Textile Production in the Eastern Mediterranean. The First Results with Ebla as a Pilot Study. *Proceedings of the Sixth International Congress of the Archaeology of the Ancient Near East 1*. 159–176. Wiesbaden.
- Archi, A. (1993) Trade and Administrative Practice. The Case of Ebla. *Altorientalische Forschungen* 20, 43–58.
- Barber, E. J. (1991) *Prehistoric Textiles. The Development of Cloth in the Neolithic and Bronze Ages, with Special Reference to the Aegean*. Princeton.
- Bar-Adon, P. (1980) *The Cave of the Treasure. The Finds from the Caves in Nahal Mishmar*. Jerusalem.
- Bergfjord, C. et al. (2010) Comment on '30,000-year-old Wild Flax Fibers', *Science* 328, 163 4.
- Bourriau, J. and Oates, J. (1997) Spinning or Sailing? The Boat Models from Eridu. *Antiquity* 71, 719–721.

- Breniquet, C. (2006) "Dans le mouton, tout est bon". Remarques sur les usages socio-économiques des animaux en Mésopotamie de la préhistoire récente au III^e millénaire avant J.-C. In C. Michel and B. Lion (eds), *De la domestication au tabou: le cas des suidés dans le Proche-Orient ancien*, 247–255. Paris.
- Breniquet, C. (2008) *Essai sur le tissage en Mésopotamie, des premières communautés sédentaires au milieu du 3^e millénaire avant J.-C.* Paris.
- Breniquet, C. (2013) Functions and Uses of Textiles in the Ancient Near East. Summary and Perspectives. In M.-L. Nosch, H. Koefoed and E. Andersson Strand (eds), 2013, 1–25.
- Burkett, M. (1977) An Early Date for the Origins of Felt. *Anatolian Studies* 27, 1–115.
- Burnham, H. R. (1965) Çatal Hüyük. The Textiles and Twined Fabrics. *Anatolian Studies* 15, 169–174.
- Cassin, E. (1959) Le bain des brebis. *Orientalia* 28–3, 225–229.
- Charvat, P. (1997) *On People, Signs and States. Spotlights on Sumerian Society, c. 3500–2500 BC*, Prague.
- Charvat, P. (2011) Of Sheep, Sumerians and the Early State. In L. Vacin (ed.) *Ancient Near Eastern Studies in Memory of Blahoslav Hruška*, 49–60. Dresden.
- Clason, A. and Buitenhuis, H. (1997) Change and Continuity in the Animal Food Resources in Bronze Age Towns of the Orient. In G. Wilhelm (hrsg.) *Die orientalische Stadt: Kontinuität, Wandel*. 199–219.
- Copeland, L. (1996) The Flint and Obsidian Industry. In P. M. M. MG. Akkermans (ed.), *Tell Sabi Abyad. The Late Neolithic Settlement*. 285–338. Leiden.
- Crawford, H. (1973) Mesopotamia's Invisible Exports in the Third Millennium. *World Archaeology* 5, 231–241.
- D'Altroy, T. and Earle, T. (1985) Staple Finance, Wealth Finance, and Storage in the Inka Political Economy. *Current Anthropology* 26, 187–206.
- Davis, S. (1984) The Advent of Milk and Wool Production in Western Iran. Some Speculations. In J. Clutton-Brock, and C. Grigson (eds), *Animals and Archaeology 3. Early Herders and their Flocks*. 265–278. Oxford.
- Davis, S. (1993) The Zooarchaeology of Sheep and Goat in Mesopotamia. *Bulletin on Sumerian Agriculture* 7–1, 1–7.
- Desrosiers, S. (2010) Textile Terminologies and Classifications: Some Methodological and Chronological Aspects. In C. Michel and M.-L. Nosch (eds), *Textile Production and Consumption in the Ancient Near East. Archaeology, Epigraphy, Iconography*, 23–51. Oxford.
- Dothan, T. (1963) Spinning-Bowls. *IEJ* 13, 97–112.
- Ducos, P. (1968) *L'origine des animaux domestiques en Palestine*. Bordeaux.
- Ducos, P. (1988) *Archéozoologie quantitative. Les valeurs numériques immédiates à Çatal Hüyük*. Paris.
- Durand, J.-M. (2009) *La nomenclature des habits et des textiles dans les textes de Mari, 1.1*. ARM 30. Paris.
- Edens, C. 1992. Dynamics of Trade in the Ancient Mesopotamian 'World System'. *American Anthropologist* 94–1, 118–139.
- Edens, C. (1999) Khor Il-Sud, Qatar: The Archaeology of Late Bronze Age Purple-dye Production in the Arabian Gulf. *Iraq* 61, 71–88.
- Ellis, R. (1976) Mesopotamian Crafts in Modern and Ancient Times: Ancient Near Eastern Weaving. *AJA* 80, 76–77.
- Englund, R. K. (1998) The Texts from the Late Uruk Period. In J. Bauer, R. K. Englund and M. Krebernik *Mesopotamien Späturuk-Zeit und Frühdynastische Zeit*, 15–233. Göttingen.
- Forest, J.-D. (1996) *Mésopotamie. L'apparition de l'Etat*. Paris.
- Frangipane, M. (ed.) (2010) *Economic Centralisation in Formative States the Archaeological Reconstruction of the Economic System in 4th Millennium Arslantepe*, Roma.
- Frangipane, M. et al. (2007) *Arslantepe Cretulae. An Early Centralised Administrative System Before Writing*. Roma.
- Frangipane, M. et al. (2010) Arslantepe, Malatya (Turkey): Textiles, Tools and Imprints of Fabrics from 4th Millennium BCE. *Paléorient* 35–1, 5–29.
- Gelb, I. (1965) The Ancient Mesopotamian Ration System. *JNES* 24, 230–243.
- Gelb, I. (1972) The Arua Institution. *RAAO LXVI-1*, 1–32.
- Gelb, I. (1973) Prisoners of War in Early Mesopotamia. *JNES* 32, 70–98.

- Gillis, C. and Nosch, M.-L. (eds.) 2007. *Ancient Textiles. Production, Craft and Society*. Oxford.
- Glassner, J.-J. (2000) *Ecrire à Sumer. L'invention du cunéiforme*. Paris.
- Good, I. (1999) *The Ecology of Exchange: Textiles from Shar-I Sokhta, Eastern Iran*. PhD Diss. Philadelphia (unpublished).
- Greenfield, H. (2010) The Secondary Products Revolution: The Past, the Present and the Future. *World Archaeology* 42–1, 29–54.
- Green, M. (1980) Animal Husbandry at Uruk in the Archaic Period. *JNES* 39–4, 1–35.
- Hardy, K. (2008) Prehistoric String Theory. How Twisted Fibres Helped to Shape the World. *Antiquity* 82, 271–280.
- Helbæk, H. (1959) Note on the Evolution and History of Linseed. *Kuml*, 103–129.
- Helbæk, H. (1963) Textiles from Çatal Hüyük. *Archaeology* 16, 39–46.
- Helmer, D. (1992) *La domestication des animaux par les hommes préhistoriques*, Paris-Milan-Barcelone-Bonn.
- Helmer, D. (2000) Etude de la faune mammalienne d'El Kowm 2. In D. Stordeur (ed.), *El Kowm 2. Une île dans le désert. La fin du Néolithique précéramique dans la steppe syrienne*, 233–257. Paris.
- Helmer D., Gourichon L. and Vila E. (2007) The Development of the Exploitation of Products from *Capra* and *Ovis* (Meat, Milk and Fleeces) from the PPNB to the Early Bronze in the Northern Near East (8700 to 2000 BC cal.). *Anthropozoologica* 42 (2), 41–69.
- Huot, J.-L. (ed.) (1996) *Tell el'Oueili. Travaux de 1987–1989*, éd. ERC, Paris.
- Huot, J.-L. (2000) Existe-t-il une 'révolution de la laine' au début de l'âge du Bronze oriental? In P. Matthiae et al. (eds), *Proceedings of the 1st International Congress on the Archaeology of the Ancient Near East*, 640–642. Rome.
- Huot, J.-L. (2005) Vers l'apparition de l'Etat en Mésopotamie. Bilan des recherches récentes. *Annales HSS*, 953–373.
- Joannès, F. (2001) Tissage. In F. Joannès (ed.) *Dictionnaire de la civilisation mésopotamienne*. 854–856. Paris.
- Kijas, J. et al. (2012) Genome-wide Analysis of the World's Sheep Breeds Reveals High Levels of Historic Mixture and Strong Recent Selection. *PloS Biology* 10–2, 1–14.
- Kvavadze, E. et al. (2009) 30,000-year-old Wild Flax Fibers. *Science* 325, 135–139.
- Lambert, M. (1961) Recherches sur la vie ouvrière: les ateliers de tissage de Lagash. *Archiv Orientalni* 29, 422–443.
- Levy, J. and Gilead, I. (2013) The Emergence of the Ghassulian Textile Industry in the Southern Levant. In M.-L. Nosch, H. Koefoed and E. Andersson Strand (eds), *Textile Production and Consumption in the Ancient Near East*. *Archaeology, Epigraphy, Iconography*, 26–44. Oxford.
- Lindemeyer, E. and Martin, L. (1993) Uruk – *Kleinfunde III*, Mainz am Rhein (AUWE 9).
- Maekawa, K. (1980) Female Weavers and their Children in Lagash: Pre-Sargonic and Ur III. *Acta Sumerologica* 2, 82–125.
- Margueron, J. (2004) *Mari, métropole de l'Euphrate*. Paris.
- Matthews, D. M. (1997) *The Early Glyptic of Tell Brak. Cylinder Seals of Third Millennium Syria*, Fribourg.
- McCorriston, J. (1997) The Fiber Revolution. Textile Extensification, Alienation and Social Stratification in Ancient Mesopotamia. *Current Anthropology* 38–4, 5 17–549.
- Mellaart, J. (1971) *Çatal Hüyük, une des premières cités du monde*, s.l. (in French).
- Michel, C. and Nosch, M.-L. (eds) 2010. *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*. Oxford.
- Miller, N. (2013) Symbols of Fertility and Abundance in the Royal Cemetery at Ur, Iraq. *AJA* 117, 127–133.
- Murra, J. (1962) Cloth and its Function in the Inca State. *American Anthropologist* 6 4–4, 710–728.
- Nadel, D. et al. (1994) 19,000-year-old Twisted Fibers from Ohalo II. *Current Anthropology* 35–4, 451–458.
- Nosch, M.-L., Koefoed, H. and Andersson Strand, E. (eds) (2013) *Textile Production and Consumption in the Ancient Near East*. *Archaeology, Epigraphy, Iconography*. Oxford.
- Ochsenschlager, E. (1993) Sheep: Ethnoarchaeology at al-Hiba. *Bulletin on Sumerian Agriculture VII: Domestic Animals of Mesopotamia, Part I*, 33–42.
- Osten, H. von der (1937a) *The Alishar Hüyük. Seasons of 1930–32. Part I*. OIP 28. Chicago.
- Osten, H. von der (1937b) *The Alishar Hüyük. Seasons of 1930–32. Part III*. OIP 30. Chicago.
- Perrot, J. (2000) Réflexions concernant l'état des recherches concernant la Préhistoire récente du

- Proche et du Moyen-Orient. *Paléorient* 26–1, 5–27.
- Peyronel, L. (2004) *Gli strumenti di tessitura dall'età del Bronzo all'epoca persiana*. Roma.
- Pettinato, G. (1972) Il commercio con l'estero della Mesopotamia meridionale nel 3.millennio av. Cr. Alla luce delle fonti letterarie e lessicali sumeriche. *Mesopotamia* 7, 43–166.
- Pournelle, J. (2007) KLM to Corona: A Bird's-eye View of Cultural Ecology and Early Mesopotamian Urbanization. In E. Stone (ed.), *Settlement and Society. Essays Dedicated to Robert McCormick Adams*. 29–62. Los Angeles.
- Rast-Eicher, A. (2005) Bast Before Wool. The First Textiles. In P. Bichler *et al.* *Hallstatt Textiles. Technical Analysis, Scientific Investigations and Experiment on Iron Age Textiles*. 17–131. Oxford.
- Rast-Eicher, A. (2008) *Textilien, Wolle, Schafe in der Eisenzeit der Schweiz*, Basel (Antiqua 44).
- Rast-Eicher, A. and Bender Jørgensen L. (2012) Sheep Wool in Bronze Age and Iron Age. *Journal of Archaeological Science* 39, 1–18.
- Rooijakkers, C. T. (2013) Spinning Animal Fibres at Late Neolithic Tell Sabi Abyad, Syria? *Paléorient* 38 1and2, 91–109.
- Ryder, M. (1965) Report of Textiles from Çatal Hüyük. *Anatolian Studies* 15, 175–176.
- Ryder, M. (1969) Changes in the Fleece of Sheep Following Domestication (with a note on the coat of cattle). In P. J. Ucko and G. W. Dimbleby (eds), *The Domestication and Exploitation of Plants and Animals*, 497–521. London.
- Ryder, M. (1982) Sheep – Hiltzheimer 45 years on. *Antiquity* 46, 15–22.
- Ryder, M. (1984) Sheep Representations, Written Records and Wool Measurements. In J. Clutton-Brock, and C. Grigson (eds), *Animals and Archaeology 3. Early Herders and their Flocks*. 69–82. Oxford.
- Ryder, M. (1990) Wool Remains from Scythian Burials in Siberia. *Oxford Journal of Archaeology* 9:3, 313–321.
- Ryder, M. (1993) Sheep and Goat Husbandry, with Particular Reference to Textile, Fibre and Milk Production. *Bulletin on Sumerian Agriculture* 7–1, 9–32.
- Ryder, M. (2007) *Sheep and Man*. London (reprinted from the 1983 edition).
- Saña, M. and Tornero, C. (2013) Use of Animal Fibres during the Neolithic in the Middle Euphrates Valley (Syria): An Archaeozoological Approach. *Paléorient* 38 (1 and 2), 79–91.
- Sanlaville, P. (2002) The Deltaic Complex of the Lower Mesopotamian Plain and its Evolution through Millennia. In E. Nicholson and P. Clark (eds), *The Iraqi Marshlands. A Human and Environmental Study*, 133–150.
- Sauvage, C. (2013) Spinning from Old Threads: The Whorls from Ugarit at the Musée d'Archéologie Nationale (Saint-Germain-en-Laye) and the Louvre. In M.-L.Nosch, H. Koefoed and E. Andersson Strand (eds), *Textile Production and Consumption in the Ancient Near East. Archaeology, Epigraphy, Iconography*, 189–214. Oxford.
- Schneider-Ludorff, H. 1998. Filz in Nuzi? In D. Owen and G. Wilhelm (eds), *Studies on the Civilization and Culture of Nuzi and the Hurrians* 9, 163–168. Bethesda.
- Steinkeller, P. (1980) Mattresses and Felt in Early Mesopotamia. *Oriens Antiquus* XIX: 2, 79–100.
- Steinkeller, P. (1995) Sheep and Goat Germinology in Ur III Sources from Drehem. *Bulletin on Sumerian Agriculture* 8, 49–70.
- Stordeur, D. (ed.) 2000. *El Kowm 2. Une île dans le désert. La fin du Néolithique précéramique dans la steppe syrienne*. Paris.
- Sudo, H. (2010) The Development of Wool Exploitation in Ubaid-Period Settlements of North Mesopotamia. In R. Carter and G. Philip (eds), *Beyond the Ubaid. Transformation and Integration in the Late Prehistoric Societies of the Middle East*, 169–179. SAOC 63. Chicago.
- Szarzinska, K. (1988) Records of Garments and Clothes in Archaic Uruk/Warka. *Altorientalische Forschungen* 15, 220–230.
- Szarzinska, K. (1993) Offerings for the Goddess Inana in Archaic Uruk. *RAAO* 87, 7–26.
- Szarzinska, K. (2002) *Sheep Husbandry and Production of Wool, Garments and Cloths in Archaic Sumer*. Warsaw.
- Sherratt, A. (1981) Plough and Pastoralism: Aspects of the Secondary Products Revolution. In I. Hodder, G. Isaac and N. Hammond (eds), *Pattern of the Past. Studies in Honour of David Clarke*. 261–305. Cambridge, London and New York.
- Strasser, T. F. (1996) The Boat Models from Eridu: Sailing or Spinning During the 'Ubaid Period'? *Antiquity* 70, 920–925.
- Tiedeman, E. J. and Jakes, K. A. (2006) An Exploration of Prehistoric Spinning Technology;

- Spinning Efficiency and Technology Transition. *Archaeometry* 48:2, 293–307.
- Van Zeist, W. and Bakker-Heeres, J. (1974) Evidence for Linseed Cultivation before 6000 BC. *Journal of Science* 2, 215–219.
- Vigne, J.-D. (2000) Les débuts néolithiques de l'élevage des ongulés au Proche-Orient et en Méditerranée: acquis récents et questions. In J. Guilaine (ed.) *Premiers paysans du monde. Naissance des agricultures*, 143–168. Paris.
- Vigne, J.-D. (2004) *Les origines de la culture. Le début de l'élevage*. Paris.
- Vila, E. (1996) Commentaire synoptique sur l'exploitation de la faune en Mésopotamie du nord à la période Uruk et au Bronze ancien. *Anthropozoologica* 23, 67–75.
- Vila, E. (1998) *L'exploitation des animaux en Mésopotamie aux IVe et IIIe millénaires avant J.-C.*, Paris.
- Vila, E. (2002) L'évolution de la taille du mouton dans le nord de la Mésopotamie: les faits et leurs causes. In L. Bodson (ed.), *D'os, d'image et de mots. Contribution à la réflexion sur les sources de l'histoire des connaissances zoologiques*, 47–79. Colloques d'histoire des connaissances zoologiques 13. Liège.
- Vogelsang-Eastwood, G. (1987–8) A Note on the So-called 'Spinning-bowl'. *Jaarbericht Ex Oriente Lux* 30, 78–88.
- Waetzoldt, H. (1972) *Untersuchungen zur Neusumerische Textilindustrie*. Roma.
- Waetzoldt, H. (1980) Leinen. *Reallexikon der Assyriologie und vorderasiatischen Archäologie*, 583–594.
- Waetzoldt, H. (2007) The Use of Wool for the Production of Strings, Ropes, Braided Mats and Similar Fabrics. In C. Gillis and M.-L. Nosch (eds), *Ancient Textiles. Production, Craft and Society*, 112–121. Oxford.
- Woolley, L. et al. (1934) *Ur Excavations II. The Royal Cemetery*. s.l.
- Zeder, M. (1994a) Of Kings and Shepherds: Specialized Animal Economy in Ur III Mesopotamia. In G. Stein and M. Rothman (eds), *Chiefdoms and Early States in the Near East. The Organizational Dynamics of Complexity*, 175–191. Madison.
- Zeder, M. (1994b) After the Revolution: Post-Neolithic Subsistence in Northern Mesopotamia. *American Anthropologist* 96:1, 97–126.

1 Huot 2005.

2 Forest 1996.

3 Part of the discussion comes from Breniquet 2008, but I focus here exclusively on wool, not on weaving as it was the case in the reference cited.

4 Vigne 2004.

5 Vigne 2000, 149–151.

6 Ryder 1969, 1982, 1984, 1993 and 2007 for a selection.

7 Rast-Eicher 2008; Kijas et al. 2012.

8 Rast-Eicher 2005.

9 Nadel et al. 1994.

10 Desrosiers 2010, 33.

11 Hardy 2008. However, the discovery of worked 'wild flax' in sediment in the Dzudzuana cave in Georgia and which apparently dates from 36,000 BC, i.e. prior to anything known today, now needs to be reevaluated. See Kvavadze et al. 2009, 1359; Bergfjord et al., 2010, 1634.

12 Helbaek 1959; Van Zeist and Bakkers-Heeres 1974.

13 Waetzoldt 1980.

14 Frangipane et al. 2009, 15.

15 Rast-Eicher and Bender Jørgensen 2012 and Rast-Eicher, in this volume.

16 Ryder 1990.

17 Frangipane et al. 2007, fig. V.5, 393.

18 Helbaek 1963.

19 Burnham 1965.

20 Ryder 1965.

21 Mellaart 1971, 219.

22 Bar Adon 1980.

23 Other occurrences of wool come probably from central Asia for the 3rd millennium: Good 1999 (not consulted).

24 Levy and Gilead 2013, 29–30.

- 25 Perrot 2000, 14.
- 26 Vila 1998, 15–31; Helmer 1992, 31–48..
- 27 Ducos 1968; Sherratt 1981.
- 28 See Stordeur 2000, 50, fig. 14, for the late PPNB house at El Kowm.
- 29 Andersson *et al.* 2010 for Ebla; Frangipane *et al.* 2010 for Arslantepe. See also Peyronnel 2004 and the contributions of Peyronnel and Laurito, Perilli and Lemonini, this volume.
- 30 Ellis 1976, 77.
- 31 Amiet 1980, 104.
- 32 Breniquet 2008, 269–324.
- 33 Michel and Nosch 2010.
- 34 Durand 2009; Michel and Nosch, 2010.
- 35 Pettinato 1972; Crawford 1973.
- 36 Lambert 1961; Waetzoldt 1972; Maekawa 1980.
- 37 Gelb 1965.
- 38 Ochenschlager 1993.
- 39 Andersson Strand 2013.
- 40 Helmer, 1992, 51–52.
- 41 Ryder 1969, 1982, 2008 for the main studies.
- 42 Davis 1984.
- 43 Vigne 2004.
- 44 Ryder 2007, 45–49.
- 45 Andersson Strand and Cybulska 2013, 114, fig. 7.2.
- 46 Rast-Eicher, this volume.
- 47 Ryder 1984.
- 48 Breniquet 2008, 94 with reference to S. Bréhard's masters degree dissertation.
- 49 Sherratt 1981, 198. Davis 1984.
- 50 Greenfield 2010.
- 51 For an overview: Saña and Tornero, 2013; Vigne and Helmer 2007; Helmer, Gourichon and Vila 2007; Helmer 2000; Davis 1993.
- 52 Vila 1996; Helmer, Gourichon and Vila 2007.
- 53 Zeder 1994 a and b; Clason and Buitenhuis 1997; Akkermans and Schwartz 2003; Greenfield 2010.
- 54 Huot 1996.
- 55 Sanlaville 2002.
- 56 Pournelle 2007.
- 57 Amiet 2002.
- 58 We may notice that Near Eastern archaeology makes a great use of religious interpretations. We think that they are not incompatible with 'social' ones. For instance, N. Miller (2012, 131–12) proposed recently to interpret the twisted wire pendants from Pu-abi's grave as symbolic ropes used to tie together sheep to be milked. These ropes may evoke both the flocks of the shepherd Dumuzi, according to the traditional reading, and the productive flock.
- 59 Glassner 2000, 89, with references to tokens.
- 60 Green 1980. See also Sallaberger, in this volume, who insists on the link between sheep and cities.
- 61 We do not think that this iconography illustrated daily life. It is more likely that it was either connected with royalty or the metaphoric use of the 'good shepherd' stereotype.
- 62 Englund 1998, 148; Archi 1993, 47.
- 63 Szarzynska 2002, 23.
- 64 Sudo 2010, 170.
- 65 Cassin 1959.
- 66 Ryder, 1993.
- 67 See Vila 2002 for an excellent study on the link between iconography and archaeozoology.
- 68 Steinkeller 1995.
- 69 See for instance the group of sheep and goats on the Peace panel of the Standard of Ur, middle register.
- 70 Szarzynska 2002, 24.
- 71 Archi 1993, 47.
- 72 Ryder 2008, 97, fig. 3.10. See also Peyronnel, this volume.
- 73 Barber 1991, 261 talked about the first occurrence of carding being much later than the Bronze Age!
- 74 See Michel, this volume.
- 75 Breniquet 2008, 278–286.
- 76 Szarzynska 2002, 31.

- 77 Barber 1991, 51–68.
78 Barber 1991, 58–61; Sauvage 2013.
79 Tiedeman and Jakes 2006.
80 Roijjakkens 2012.
81 Sudo 2010, 172–173.
82 Dothan 1963; Vogelsang-Eastwood 1977–1978.
83 Strasser 1996; Bourriau and Oates 1997.
84 Barber 1991, 57, fig. 2.18.
85 Barber 1991, 223.
86 Englund 1998, 98.
87 Edens 1999.
88 Margueron 2004, 169–170.
89 Barber 1991, 215; Steinkeller 1980; Schneider-Ludorff 1998.
90 Andersson Strand 2012.
91 Von der Osten, 1937a, 44–51 and 1937b, 334–355.
92 Breniquet 2008, 164–166.
93 Bar Adon 1980, ill. 56.
94 Breniquet 2008, 64.
95 Murra 1962.
96 D'Altroy and Earle 1985.
97 Breniquet 2006.
98 For the complete demonstration see Breniquet 2008.
99 Breniquet 2008, 328–331.
100 Gelb 1972. The *arua* institution is very similar to the Peruvian *akla*.
101 Charvat 2011 and this volume.
102 Breniquet 2008, 297–313.
103 Joannès 2001, for an overview.
104 Forest 1996, 237–238; Gelb 1973.
105 Wool and goats' hair can be used for daily objects as shown by Waetzoldt 2007.
106 Szarzinska 1993. The baskets held by men on the middle register of the Uruk vase might contain wool for Inanna.
107 Gelb 1965.
108 Crawford 1973.
109 Breniquet 2013.
110 McCorriston 1997; Huot 2000.

5. Lambs of the Gods. The Beginnings of the Wool Economy in Proto-Cuneiform Texts

Petr Charvát

From time immemorial, wool and wool products represented one of the staple contributions of the Sumerian economy to the welfare of citizens of various Mesopotamian states but also to the well-being of all the customers of Sumerian export enterprises. In addition to their economic significance, data on the processing of this commodity constitute important historical sources, offering a twofold opportunity to historical research.

First and foremost, many Mediterranean and Near Eastern regions saw during their history an intense cooperation between settled agriculturalists and more or less nomadic livestock-keepers both of whom exploited various ecological niches of the richly differentiated local landscapes.¹ The geographically dispersed production base of the textile-industry segment of livestock-keeping, which was a consequence of the fact that the animals move over appreciable distances throughout the year, thus presented special obstacles to any form of centralized management and control of this presumably age-old occupation. The evidence of these particular problems left in written sources can tell the student a great deal about the determination and vigour, but also managerial skills of the central administration which intended to harness the production of the unpredictable and elusive pastoralists for its own purposes.

Second, ethnological data show beyond any doubt that weaving of textiles is one of the crafts that possesses the lowest potential for specialization.² This trade is therefore especially suitable as an indicator of social change and particularly of the depth of transformations that are assumed to involve craft specialization as an accompanying phenomenon of any movement along the path towards the building of more complex social bodies, to which the pristine states undoubtedly belong.

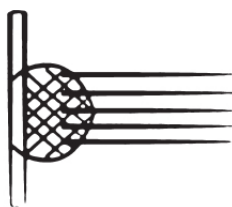
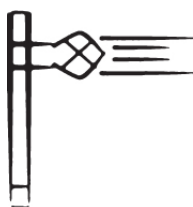
In the texts of Uruk- and Jemdet-Nasr age from Uruk,³ constituting a primary source for the formative stage of one of the world's first literate civilization, the topographically dispersed nature of Near Eastern livestock-keeping, emerging from transhumance practices, may already be apparent.

A series of structures, referred to by separate signs of the earliest cuneiform script, played their roles in the early Sumerian wool business.⁴



ZATU 647

The first of these, bearing the sign ZATU 647,⁵ is similar in appearance to a sort of 'tennis racket'. The sign consists of a long singular 'arm' to which a triangular terminal is added at one end. Within this terminal, the 'inner side' is doubled, forming a small compartment turned towards the interior of the whole structure. The entity denoted by this sign contained a storeroom for wool,⁶ and probably operated by its own personnel.⁷ Here the shape of the structure does not, in fact, exclude that the sign depicts a ground-plan of a facility for shearing sheep, especially in view of its morphological analogy with the 'desert kite' sites. The animals might have first been driven along the 'arm' of the edifice into the small compartment where shearing itself might have taken place. The wool could then have been stored in a space denoted by the interior of the triangular enclosure – or vice versa, of course.



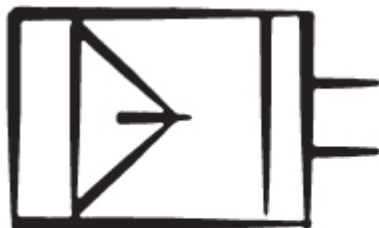
ZATU 752

GIBIL

Storage of wool also took place in another structure denoted by ZATU 752. In this case, the sign probably depicts a ground plan of a rectangular enclosure superimposed by the sign showing a shorn 'head' of a date palm with but a bundle of leaves left at the highest point, perhaps in allusion to the sign GIBIL, 'new' (ZATU 214, a new storeroom?). Alternatively, some forms of this sign may refer to materials indicated by a series of short parallel strokes. This was used for wool, textiles and liquid goods in storage jars.⁸ Text No. W 20274, 30, listing textiles deposited at the ZATU 752 of the arch-priest EN,⁹ was found together with a series of seal impressions.¹⁰ Herr Rainer Michael Boehmer, who was kind enough to look up those components of this find, located presently at Heidelberg,¹¹ and to inspect them, informs me that he has observed impressions of rims and necks of pottery vessels on their versos. From this it may follow that the structure once contained, among others, (also) ready-made textiles stored and transported in large pottery containers, in a manner depicted on late fourth-millennium glyptic from Uruk and Susa.¹² Rainer Michael Boehmer himself refers to such pottery containers for textile products, depicted on cylinder seals, as to 'Ölgefäße mit Fransentücher'.¹³ It is tempting to see in this find evidence for a consignment of textiles sent from the ZATU 752 to Uruk, in sealed pottery containers with an accompanying list. The

administrative centre might have checked the correctness of the delivery, and then discarded both the containers and the list, as no longer necessary.

In this case, ZATU 752 seems to refer to an interim, second-stage storage capacity, a 'halfway house' to which different kinds of animal-husbandry products in various stages of completion were conveyed from their production sites or locations of primary storage.¹⁴



ZATU 737 + SAL

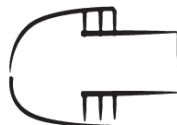
The raw material was subsequently delivered to workshops where it was processed into textiles. One such plant is referred to by the sign ZATU 737 + SAL, eloquently indicating the female sex of the labour force employed in it.¹⁵ Run by the orders of, and for, EN, this establishment probably supplied a quantity of textiles circulating throughout the public sphere of proto-cuneiform society. There are references to the textiles EN issued from this site and also to SAL + KUR (presumably slave girls) of the ZATU 737. This is evidently the next, third step in the whole operational chain, a plant where the animal-husbandry products took their final shape as textiles.¹⁶

In addition to tasks linked with particular institutions or sites, the texts also record a number of specific textile materials transferred to the SAL, and shows connections with some of the structures mentioned above.¹⁷ These show that such women probably both produced, and received, textiles, sometimes as rations, sometimes not, occasionally on festive days.

In one instance, UŠ (male servile personnel) received textiles together with SAL. Here we may surmise provisions for the workforce of Uruk.¹⁸ Another case refers probably to matting products issued to UŠ.¹⁹ Still elsewhere, there is a UŠ figure in connection with textile- and possibly leather products.²⁰

A fragmentary text refers to wool together with URU, the primeval form of Mesopotamian cities.²¹

A lucky chance has preserved for us a text in which the highest dignitary of the Uruk-age society, EN, gives out 'rations' (BA) of wool (SIG₂) and cloth (TUG₂).²² The 'pure new wool' of one-year old lambs was at first treated by a procedure referred to by the sign ZATU 719, which, given the form of the sign probably depicting a comb with bigger side teeth, could well denote wool-combing. Then it went to ZATU 737 + SAL, referred to above, and to a structure referred to as ZATU 753 which is also likely to have been connected with textile production, perhaps as a weaving workshop.



ZATU 719

The EN could store textiles in still other structures featuring in the texts. This is the case for ZATU 651, from which an EN issues textile(s) to a LUGAL.²³ The sign seems to depict a section through a structure of flexible materials with a curving roof; a shelter, similar to those built of reeds by the present-day marsh Arabs of Iraq, may have served as its model.

ZATU 753

Let us notice *en passant* that even commercial activities in which wool played the role of a commodity delivered in exchange for foreign goods – probably stone beads, in this case – may be present at this early date. In one instance, a LUGAL received within the E₂.KUR, ‘house of the foreign lands’, NUNUZ-KUR (foreign beads?) of Elam (NIM), deposited in a structure denoted as GA (storeroom?) intended for use as BA (‘rations?’), for wool.²⁴

ZATU 651

Further publications of Uruk texts round up the picture.²⁵ Here we encounter some of the features that we have met already. Among the officials concerned, EN (text No. W 10731), PA RAD (text No. W 10803, b+), SUG₅ (W 10585) and GAL GURUŠ NUN (W 15 897, b1) appear. Communities (?) and sites referred to include the E₂ NAR AN, where plucked wool was disbursed (text No. W 15897, c2), KISAL GI, to which goods were delivered (text No. W 15897, c19), and PA KI (text No. VAT 15288). Text No. W 10846 distinguishes between SIG₂ EN and TUG₂ EN. We can again see the link between textiles and comestibles.²⁶ In text No. W 14353, an otherwise unknown E₂ KAL₂ appears.

Among the texts from other sites than Uruk, a group of sources (for which the prosopographical and other connections point to Tell Uqair) supplies interesting information.²⁷ These show the connections between comestibles and textiles²⁸ and metals and textiles,²⁹ possibly in consequence of the mixed character of production in the ZATU 752 plant. Here the metal entries follow the initial lines of the sequence documented in the Archaic Metal List.³⁰

The texts display two types of closing clauses. The formula PA KITI may appear twice.³¹ In text MSVO 4, No. 24 this formula is superimposed by ME EN KU₆ RAD UR₂, followed by SAG KU.³² The latter clause ME EN KU₆ RAD UR₂ then appears in other texts.³³ Text MSVO 4, No. 24 bears impression of a seal, showing what might have been a procession of humans and identical with that of text MSVO 4, No. 14, an account of small cattle.³⁴ Text MSVO 4, No. 14 also bears the ME EN KU₆ RAD UR₂ formula. In Robert Englund’s opinion, the sign group KU₆ RAD UR₂ refers to the ancient city of Urum.³⁵

In view of the fact that two texts bearing the same toponym (?) KU₆ RAD UR₂ bear impression of the same seal,³⁶ it might be speculated whether this seal did not belong to the highest authority of the KU₆ RAD UR₂, but, of course, two instances do not constitute a solid base.

Sketchy and incomplete as the evidence of these texts, pertaining to the EN office, may be, it does show some remarkable features of economic facilities linked with the functions of this highest rank of the pristine state society of Sumerian Mesopotamia. Treatment of the wool, its storage and progression into finished

textiles obviously took place at very different locations, and the products had to be carried over distances and routes making it worthwhile to protect them, especially the finished textiles, by containers in the form of pottery jars.

One of the factors at play that the production managers must have considered was the fact that the plucking of sheep had to take place at the sites of their summer transhumance.³⁷ The transport of raw materials, half-finished goods and ready-made products among the various component sites of the system must have been time- and energy-consuming, but the Uruk-polity administration obviously carried on with this situation which is somewhat reminiscent of the ‘dispersed-manufacture system’ of European early capitalism.

In addition to this, the fact that such structures are expressly referred to in connection with the EN points to the existence of other such plants that did not belong to the EN and bears out the plurality of economic subjects of the Late Uruk age, as well as the essential compatibility of EN’s economic establishments with those of other subjects. It would thus seem that the EN’s economic ventures represented simply an adjustment to the existing ways and means of exploitation of the already existing animal-husbandry industry.

The site of Jemdet Nasr and its texts offers evidence that sheds light on temporal developments within the textile-production and -treatment sphere.³⁸ Wool appears in two mixed, possibly annual accounts, disbursed (GU₇), in the former case, from the NI + RU.³⁹



SIG₂



TUG₂

The other texts, however, yield a picture completely different from that of the Late Uruk age. Those pertaining to textiles can be found under the headings of SIG₂,⁴⁰ ŠU₂,⁴¹ and TUG₂;⁴² the GADA sign is not attested to at Jemdet Nasr. No traces of primary plucking- or production centres appear in them. The one single case where this may not apply is text MSVO 1, No. 205, with its sub-total of TUG₂ UB, and summary of UDU and TUG₂. The textiles invariably occur in ‘mixed accounts’, lists of commodities of all kinds, mostly comestibles, with which they travel (in all directions?). The textile-management points referred to in the texts are divided between the NI + RU and other agencies, including a NI + RU of Inanna at Uruk,⁴³ and possibly the city of Nippur.⁴⁴ One marked feature links all texts referring to textile deliveries – with but a single exception,⁴⁵ they do not turn up in texts bearing the ‘City League’ seal impression.⁴⁶

Text MSVO 1, No. 120, a list of animals from the site of Jemdet Nasr, dating to around 3000 BC, is denoted as DUB KUR GI (‘tablet of return from the

mountains'), which may well refer to animals coming back from the summer pastures in the mountains.⁴⁷ This may link up with the GU₄ KASKAL UB of text MSVO 1, No. 132.

In this perspective, the site of Jemdet Nasr seems to be a major redistribution centre of goods produced elsewhere – a kind of Drehem of the turn of the 4th and 3rd millennia BC.

At least some of the changes and transformations that came along after c. 3000 BC, when the pristine Uruk culture died out and its individual member communities appropriated its economic, social, cultural and spiritual values, are illuminated by finds from the southern Sumerian city of Ur, dating to the incipient 3rd millennium BC.⁴⁸ Excavating within the central sacred precinct of the city, the Leonard Woolley expedition (1922–1934) explored also the archaeological strata below the famous 'Royal Cemetery', but above the so-called 'Jemdet Nasr cemetery'. These strata have yielded alternate layers of both domestic and administrative refuse including numerous find groups of seal impressions on clay, referred to as 'Seal-impression strata' (SIS). Their chronology is still disputed, but a general dating is likely to fall between the years 3000 and 2600 BC.⁴⁹

These seal-impression bearing strata constitute an ideal source category for the investigation of economic, administrative, social and spiritual structures streamlining the life of one of the major successor states of the Uruk-age culture. The analysis of the inscriptions borne by the sealed surfaces will give fairly instructive data for the use and socio-economic context of the relevant seals. On the other hand, impressions which the sealed objects left behind on the reverses of the clay sealings will reveal the type of seal carrier, and thus provide first-rate evidence of social and administrative practices of the relevant period. Inscribed seal impressions excavated from reasonably well-dated contexts will thus offer a historian the best possible material for studies of the socially engineered goods-exchange practices available.⁵⁰

As for livestock-raising, evidence for domestic sheep, goats, cattle and possibly domestic pigs has been gathered at the ED-I village of Sakheri Sughir by Ur.⁵¹ According to the archaic Ur texts, sheep and goats made up relatively large flocks there,⁵² and were probably distributed by some central agency for sheep plucking, as well as meat consumption.⁵³

The age-old practice of transporting textiles in pottery vessels as containers is borne out by the Ur material.⁵⁴

Seal UE 3, No. 433⁵⁵ may even register taxpayers rendering their dues in textiles (GADA + DU, GADA). A similar case may be supposed in seal UE 3, No. 442,⁵⁶ with its signs GADA, LU₂ + TAK₄, E₂ + KI, ŠIDIM + SILA₄ (architect?), SU₃ + ŠU₂ (tributary of textiles?), NIMGIR + GAL, featuring personages, dignitaries, institutions, and professions, as well as taxpayers.

Various commodities including wool were brought to (cultic?) statues under the UR₂ title.⁵⁷ The supplying of plucked sheep wool in pots (and so presumably referring to raw wool),⁵⁸ probably belongs to this category of deliveries as well.

The three impressions published by Leon Legrain as UE 3, No. 395,⁵⁹ and one as UE 3, No. 436⁶⁰ merit a closer consideration of their reverses. Two impressions of mobile containers, and one which may indicate a storage space, show that in the Ur case, bales of plucked wool were supplied to the centre under a seal indicating in writing their contents. At the delivery point, such bales were stored in a

building the access to which was also controlled by a seal referring to its contents.

At least some features of sheep rearing at Ur may be glimpsed from early cuneiform texts, retrieved from the Seal Impression Strata 5–4, which thus complement data from the seal impressions.⁶¹

Unfortunately, most of the texts referring to sheep⁶² list individual recipients or donors with the respective numbers of animals these people were concerned with. There are just two points where the information of the seal impressions may be complemented. At the end of the first column of UET 2, No. 255 is the sign BAD₃,⁶³ which may stand for the toponym Durum. The sign inscribed in the middle seems to be AŠ, not AN. It may thus refer to a site named Durum, as the AŠ = RUM phonetic complement might indicate.⁶⁴ The sign is probably identical with signs UET 2, Nos. 301 and 302, and with LAK Nos 618 and 619. The sign combination BAD₃ + AN may have been read UB in Pre-Sargonic Lagaš.⁶⁵ Geštinanna was venerated at a site called sag – ub there. In addition to that, BAD₃ + AN + KI may be Dēr, but could essentially be any fortified city.⁶⁶

Here the question obviously is how far this is a toponym, and whether the denoted structure may possibly be identified as a general-purpose device of economic significance (a ‘corral’?).

Text UET 2, No. 80 bears a subscript udu – ur₄, ‘sheep plucking’.⁶⁷ No more than two lines with the poorly preserved remains of a third one have survived, but it seems that the sheep to be plucked were denoted as belonging to individual persons. Thus, the seals denoting bales of plucked wool presumably referred to individuals, or, of course, to any social bodies these individuals belonged to.

In comparison with the fourth-millennium (Late Uruk) situation, three differences in administrative practices do thus stand out, as pointed out by an investigation of the Ur sealings of early 3rd millennium:

- 1) Late Uruk times, scribes preparing written documents actually went to the field, and wrote their texts outside the centre. As against this, the Ur administration sent out seal-bearers, who presumably marked the harvest shares due to the centre by seals, not by writing.
- 2) Late Uruk seal-bearers did not use inscribed seals. As against this, the Ur officials carried seals with impressions enabling them to identify the products collected for the central administration. Such office holders did not employ writing but they were obviously literate.
- 3) Late Uruk times, the wool fleeces went through four (to five) spatially distinct sites before they ended in the Uruk storerooms. As against this, the Ur tax collectors (?) sent the harvest shares due to the central administration directly to the centre, from the administrative discards from which the used sealings were retrieved after nearly five thousand years. An alternative would be field storage facilities, from which the deliveries travelled to the central collecting point, if the reverse of the sealing No. UM 33–35–292⁶⁸ actually copies the surface of a shelter built of reed wickerwork.

What comes out of these observations is an image of a large but loosely organized cluster of Uruk-age communities transformed into smaller, but more efficient and more ‘rational’, Early Dynastic polities. The central administration of Ur obviously shortened the circuit of goods throughout its realms, and concentrated the qualified treatment of raw materials – sheep wool, in our instance – into workshops situated presumably close to the residence of the central management. At the same time, the Ur administration employed literate officials. Here the contraction of the early-state core brought about also a rationalization of its procedures.

The inhabitants of houses sheltering the population of the ED-III Sumerian city

of Šuruppak (modern Fara) of the incipient ED III period still relied on their own domestic production of textiles, as the archaeological finds of spindle whorls from the site show. Most of these small discs were found in layers dating the Jemdet Nasr through ED II, though a few appeared as late as Ur-III times.

The earliest spindle whorls (JN–ED I) are mostly of pottery, and bear incised decoration. Some one-third of the entire group, all of the ED age, were made of stone, and were accompanied by plain perforated flat discs, mostly re-ground from potsherds and also possibly serving as spindle whorls, of the same date.⁶⁹

The economic texts of Fara (Šuruppak) make us wonder especially about the remarkable size of the flocks concerned: up to 1050 rams or wethers. The animals of these herds, managed apparently by the uru administrative sector of Šuruppak, were kept both for consumption (udu-ku₂) and for wool (udu-sig₂). Suppliers of finished textile products (tug₂-du₈)⁷⁰ did nonetheless work both for the ‘urban’ (uru) and ‘palatial’ (e₂-gal) sectors of the Šuruppak economy.⁷¹ The Fara texts distinguish between two wool types: gada⁷² and gu.⁷³ The sig₂-gu occur in the form of thread, so that the sig₂-gada might be assumed to represent unspun material (before or after combing? or is this linen?). We even have gada-tug₂, the nature of which eludes me, and mu-gu, which may stand for yarn.⁷⁴ Wooden containers for sheep wool, known from archaic Ur (see above), turn up at Šuruppak as well.⁷⁵

Unfortunately, the low number of Fara texts referring to raising of sheep and other small cattle does not warrant any more general conclusions, and prevents us from the perception of organizational features of livestock-raising at Šuruppak.⁷⁶ Giuseppe Visicato puts forward the hypothesis that during the Šuruppak age, the livestock-raising sector of Sumerian economy rested on a common, inter-urban economic and administrative organization of that pursuit, centred at Šuruppak itself.⁷⁷

The Fara texts refer to deliveries of textile products only,⁷⁸ but they do contain combinations of textiles with metal items⁷⁹ and possibly also with comestibles.⁸⁰ This may result from registration of the output of comprehensive production facilities where craftsmen and craftswomen of various trades worked together, as indicated by the texts listed below.

In some instances the written materials allow us a glimpse into the functioning of the ‘great houses’ of Šuruppak. The site XVII c,d, for instance, yielded 96 texts relating to matters of personnel, objects of diverse kind, sheep, wool, barley, copper and ninni₅ (fish traps). Giuseppe Visicato suggests that such commodities went to people conscripted to do work, or army service, at Šuruppak, and interprets the evidence as pointing to the character of the site as headquarters of the logistical organization of the army.⁸¹

Findspot HI 47/48/58, Level 2, yielded texts referring to personnel, grass, wool, hides and copper,⁸² various goods, and one literary composition. Prosopographical links indicate a possible connection with the archive of DP 7, which may be slightly later than the group under consideration here. Our text group might have once belonged to another temple-household archive, perhaps that of the deity Sud.⁸³

Findspot DE 38/39 and DP 7 represents an infilled drainpipe, in which 34 or 35 tablets were found. Twenty of these, written, as it seems, at a central administrative agency and not in the shrines themselves, relate to offerings of kids to the major deities of Šuruppak; one of them concerns sheep.⁸⁴ Was this an

archive of a temple,⁸⁵ or that of a private household? The goddess Ninunug also received sheep wool at Šuruppak.⁸⁶ The deliverer of some of these goods, a person named Urni (ur₂-ni), might have held his property as šuku land from the temple household of Ninkinnir.

In the Fara texts, the function of wool as means of payment and a kind of currency still applies, as additional payments in wool are recorded among the compensations listed in the land-sale documents.⁸⁷

The documentation surviving from Šuruppak thus harks back to the by then defunct usages of the Late Uruk age, but with notable exceptions. No references to sheep-plucking and wool treatment appear – just particular products, half-finished or finished, which travel among the consumers of the huge Šuruppak polity, of both sacred and profane spheres. Apparently, here the traffic concerned not the production processes and facilities, but finished commodities redistributed among those deemed worthy by the Šuruppak managers.

*

In concluding our observations, we cannot fail to observe the slow but steady progress of economic specialization and pressure for efficiency.

In the Late Uruk age, the complete (?) *chaîne opératoire* of textile production can be followed according to the documentation left behind by the office of one of the land's highest dignitaries – the EN. Here, all the textile work had to be done on a spatially diffuse base and, as it would seem, with servile work force.

As against this, the texts from Jemdet Nasr lack any references to primary textile production, and record the circulation of deliveries of various kinds of material goods (including textiles, comestibles, and even animals) in specific consumer circuits. In so doing, they omit almost totally the sphere documented by tablets bearing the 'City League' seal.

The archaic Ur texts skip the sphere of primary textile production as well. Nevertheless, they let us know that both raw wool and finished textiles were reaching the central-administration storage facilities. Where the sheep were plucked, who-and where produced these textiles, and where, is not evident from the written evidence available. Yet, as at least one of the Ur sealings bears the designation (?) GADA DU,⁸⁸ and as the 'City League' sealings from Ur name some of the products exchanged as 'tax',⁸⁹ the conclusion that at least some of the textiles went to Ur as tax payments seems legitimate. This evidence does thus show the simplification of the circuits of goods, and possibly the appearance of groups of specialized craftsmen and craftswomen who took over the manufacture of textile goods, and supplied them to the central management- and administration agency.

Finally, the texts found at Fara also leave out any references to primary textile production. The textiles do nonetheless occur among the supplies delivered to, and handled by, both sacred and profane agencies of the Šuruppak polity. In some instances we may even catch a glimpse of groups of dependents that furnished such deliveries, as the household of Ur₂-ni.

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Abbreviations

- ATU^A1 Falkenstein, *Archaische Texte aus Uruk*. Berlin und Leipzig: Deutsche Forschungsgemeinschaft, Kommissionsverlag Otto Harrassowitz 1936.
- ATU^R3 K. Englund, H.-J. Nissen, *Die lexikalischen Listen der Archaischen Texten aus Uruk (Ausgrabungen der Deutschen Forschungsgemeinschaft in Uruk-Warka, Bd. 13, Archaische Texte aus Uruk Bd. 3)*. Berlin: Gebr. Mann Verlag 1993.
- ATU^R5K. Englund, R. M. Boehmer, *Archaic administrative texts from Uruk. The early campaigns (Ausgrabungen der Deutschen Forschungsgemeinschaft in Uruk-Warka, Bd. 15, Archaische Texte aus Uruk Bd. 5)*. Berlin: Gebr. Mann Verlag 1994.
- ATU^R6 K. Englund, H.-J. Nissen, R. M. Boehmer, *Archaische Verwaltungstexte aus Uruk – Vorderasiatisches Museum II (Ausgrabungen der Deutschen Forschungsgemeinschaft in Uruk-Warka, Bd. 16, Archaische Texte aus Uruk Bd. 6)*. Berlin: Gebr. Mann Verlag 2005.
- LAK. Deimel, *Die Inschriften von Fara I: Liste der archaischen Keilschriftzeichen*. Leipzig: J. C. Hinrichsche Buchhandlung 1922.
- MER. Labat, *Manuel d'épigraphie akkadienne. Sixième édition par Florence Malbran-Labat*. Paris: Geuthner 1988.
- MSWOK. Englund, J.-P. Grégoire, R. J. Matthews, *The Proto-Cuneiform Texts from Jemdet Nasr 1*. Berlin: Gebr. Mann Verlag 1991.
- MSWOK. Englund, R. J. Matthews, *Proto-Cuneiform Texts from Diverse Collections (Materialien zu den frühen Schriftzeugnissen des Vorderen Orients Bd. 4)*. Berlin: Gebr. Mann Verlag 1996.
- UEB. Legrain, *Ur Excavations volume III: Archaic Seal Impressions. London and Philadelphia: The Trustees of the Two Museums (The British Museum and The University Museum)*, by the aid of a Grant from the Carnegie Corporation of New York 1936.
- UEE2Burrows, *Ur Excavations, texts II: Archaic Texts. London and Philadelphia: Trustees of the two Museums (The British Museum and The University Museum, University of Pennsylvania, Philadelphia)* 1935.
- ZA^{FU}-J. Nissen, M. Green, *Zeichenliste der archaischen Texte aus Uruk*. Berlin: Gebr. Mann Verlag 1987.

Bibliography

- Amiet, P. (1961) *La glyptique mésopotamienne archaïque*. Paris.
- Boehmer, R. M. (1999) *Uruk – Früheste Siegelabrollungen. Ausgrabungen in Uruk-Warka – Endberichte 24*. Mainz am Rhein.
- Carroué, F. (1981) Geštinanna à Lagaš. *Orientalia* 50, 121–136.
- Chang, C. (1993) Pastoral Transhumance in the Balkans as a Social Ideology: Ethnoarchaeological Research in Northern Greece. *American Anthropologist* 95, 687–703.
- Charvát, P. (1993) *Ancient Mesopotamia. Humankind's Long Journey into Civilization*. Prague.

- Charvát, P. (1997) *On People, Signs and States. Spotlights on Sumerian Society*, c. 3500–2500 BC. Prague.
- Charvát, P. (2002) *Mesopotamia Before History*. London and New York.
- Charvát, P. (2005) The Backs of Some Sealings from Nineveh 5. *Iraq* 67, 391–397.
- Charvát, P. (2010) Inscriptions on Sealings from Archaic Ur. In K. Šašková, S. Pecha and P. Charvát (eds), *Shepherds of the Black-headed People. The Royal Office Vis-à-vis Godhead in Ancient Mesopotamia*, 39–74. Plzeň.
- Charvát, P. (2011) On Sheep, Sumerians and the Early State. In L. Vacín (ed.), *U₄ du₁₁.ga-ni ša mu-ni-ib-du₁₁*, *Ancient Near Eastern Studies in Memory of Blahoslav Hruška*, 49–60. Dresden.
- Cohen, A. C. (2005) *Death Rituals, Ideology, and the Development of Early Mesopotamian Kinship: Toward a New Understanding of Iraq's Royal Cemetery of Ur*. Ancient Magic and Divination 7. Leiden and Boston.
- Cribb, R. (1991) *Nomads in Archaeology*. Cambridge.
- Deimel, A. (1924) *Ausgrabungen der Deutschen Orient-Gesellschaft in Fara und Abu Hatab. Die Inschriften III: Wirtschaftstexte aus Fara*. Leipzig.
- Dittmann, R. (2006) Bemerkungen zu Ur, Pit F. *Baghdader Mitteilungen* 37, 23–44.
- Englund, R. K. (1990) *Organisation und Verwaltung der Ur-III-Fischerei*. Berlin.
- Englund, R. K. (1995) Regulating Dairy Productivity in the Ur III Period. *Orientalia* 64, 377–429.
- Frangipane, M. (2010) The Political Economy of the Early Central Institutions at Arslantepe. Concluding Remarks. In M. Frangipane (ed.), *Economic Centralisation in Formative States. The Archaeological Reconstruction of the Economic System in 4th Millennium Arslantepe*, 289–307. Studi di Preistoria Orientale vol. 3. Roma.
- Hauser, S. R. (ed.) (2006) *Die Sichtbarkeit von Nomaden und Saisonalen Besiedlung in der Archäologie, Multidisziplinäre Annäherungen an ein methodisches Problem*. Mitteilung des SFB 'Differenz und Integration' 9, Orientwissenschaftliche Hefte herausgegeben vom Orientwissenschaftlichen Zentrum der Martin-Luther Universität Halle-Wittenberg Heft 21/2006, Halle (Saale).
- Hruška, B. (1995) Herden für Götter und Könige. Schafe und Ziegen in der altsumerischen Zeit. *Altorientalische Forschungen* 22, 73–83.
- Maggi R, Nisbet R. and Barker, G. (eds) (1990) *Atti della tavola rotonda internazionale: Archeologia della pastorizia nell'Europa meridionale I–II*, Chiavari, 22–24 settembre 1989. In Rivista di Studi Liguri 66/1–4, 1990, and 67/1–4, 1991.
- Marchetti, N. (2006) *La statuarie regale nella Mesopotamia protodinastica* (Atti della Accademia Nazionale dei Lincei Anno CDIII, Classe di scienze morale, storiche e filologiche, Memorie, Series IX, Volume XXI, Fascicolo I), con un Appendice di Gianni Marchesi (205–271). Roma.
- Martin, H. P. (1988) *Fara: A Reconstruction of the Ancient Mesopotamian City of Shuruppak*. Birmingham.
- Martin H. P., Pomponio F., Visicato G. and Westenholz A. (2001) *The Fara Tablets in the University of Pennsylvania Museum of Archaeology and Anthropology*. Bethesda, Maryland.
- Matthews, D. M. (1997) *The Early Glyptic of Tell Brak: Cylinder Seals of the Third Millennium Syria*. Fribourg and Göttingen.
- Matthews, R. J. (1993) *Cities, Seals and Writing: Archaic Seal Impressions from Jemdet Nasr and Ur*. Berlin.
- McMahon A. and Oates J. (2007) Excavations at Tell Brak 2006–2007. *Iraq* 69, 145–171.
- Müller-Karpe, M. (1993) *Metallgefäße im Iraq I (Von den Anfängen bis zur Akkade-Zeit)*. Prähistorische Bronzefunde Abteilung II Band 14. Stuttgart.
- Neumann, Hans (1996) Review of MSVO 1. *Orientalistische Literaturzeitung* 91, 22–28.
- Rehm, E. (2003) *Waffengräber im Alten Orient – Zum Problem der Wertung von Waffen in Gräbern des 3. und frühen 2. Jahrtausends v. Chr. in Mesopotamien und Syrien*. British Archaeological Report S1191. Oxford.
- Rova, E. (1994) *Ricerche sui sigilli a cilindro vicino-orientali del periodo di Uruk/Jemdet Nasr*. Roma.
- Sanders, W. T. and Webster, D. (1988) The Mesoamerican Urban Tradition, *American Anthropology* 90, 521–546.
- Saidel, B. A. and Van der Steen, E. J. (eds) (2007) *On the Fringe of Society: Archaeological and Ethnoarchaeological Perspectives on Pastoral and Agricultural Societies*. British Archaeological Report S1657. Oxford.
- Steinkeller, P. (1995) Review of ZATU. *Bibliotheca Orientalis* 52, 689–713.

- Stepień, M. (1996) *Animal Husbandry in the Ancient Near East*. Bethesda, Maryland.
- Sürenhagen, D. (1999) *Untersuchungen zur relativen Chronologie Babyloniens und angrenzender Gebiete von der ausgehenden Ubaidzeit bis zum Beginn der Frühdynastisch II-Zeit 1, Studien zur Chronostratigraphie der südbabylonischen Stadtruinen von Uruk und Ur*. Heidelberg.
- Szarzyńska, K. (2002) *Sheep Husbandry and Production of Wool, Garments and Cloths in Archaic Sumer*. Warsaw.
- Szarzyńska, K. (2011) The Urukian Archpriest EN in the Archaic Period. A Few Remarks on his Functions. *Palamedes* 6, 5–15 (reference courtesy Małgorzata Sandowicz).
- Šašková K., Pecha L. and Charvát P. (eds) (2010) *Shepherds of the Black-headed People. The Royal Office Vis-à-vis Godhead in Ancient Mesopotamia*. Plzeň.
- Van Driel, G. (1993) Bones and the Mesopotamian State? Animal Husbandry in an Urban Context. *Bibliotheca Orientalis* 50, 546–563.
- Visicato, G. (1995) *The Bureaucracy of Šuruppak. Administrative Centres, Central Offices, Intermediate Structures and Hierarchies in the Economic Documentation of Fara*. Münster.
- Waetzold, H. (1983): Leinen. In *RLA VI*, Berlin, 583–594 (reference courtesy C. Michel. C. Breniquet).
- Waetzoldt, H. (2007) The Use of Wool for the Production of Strings, Ropes, Braided Mats, and Similar Fabrics. In C. Gillis and M.-L. Nosch (eds), *Ancient Textiles: Production, Craft and Society*, 112–121. Oxford. (reference courtesy C. Michel. C. Breniquet).
- Westenholz, J. G. (1997) *Legends of the Kings of Agade*. Winona Lake.
- Wilcke, Kl. (1996) Neue Rechturkunden der altsumerischer Zeit. *Zeitschrift für Assyriologie* 86, 1–67.
- Wright, H. T. (1969) *The Administration of Rural Production in an Early Mesopotamian Town*. Anthropological Papers, Museum of Anthropology, University of Michigan No. 38. Ann Arbor.
- Zettler R. and Horne L. (eds) (1998) *Treasures from the Royal Tombs of Ur*. Philadelphia.

Electronic sources

Proto-cuneiform sign list: <http://www.cdli.ucla.edu/tools/SignLists/protocuneiform/archsigns.html>, cited November 16th, 2012.

Appendix

Annotations of cited Late Uruk- and Jemdet Nasr-age texts See also MSVO 4, 12:
GI = delivery, BA = disbursement.

ZATU-752

- W 20246, 1 = from ZATU-752 of Šuruppak (DUG, U₂, ERIM₂, SIG₂, SAL BAR, TUG₂ + BAD + BAD, DARA₄ = bale of wool?, ŠURUPPAK ZATU-752 GU₇) = delivery of materials to ZATU-752 of Šuruppak which consumed them;
- W 20274, 30 (ŠU₂, TUG₂ 2x, TUG₂ BUR₂ = similar to KI, TUG + BAD + BAD, UDU, MAŠ, GA'AR, SIG₂, SIG₂ ZATU-749 = mat?, EN ZATU-752) = of EN, textiles and comestibles);
- W 20327, 3 (TUG₂, GA + ZATU-753, EZEN AN MUŠ₃, ZATU-647, BA, IB SUG₅ LA₂, E₂ ZATU-752 SAL, U₂ SUKKAL BA GU₇ GA + ZATU-753) = among the items also labour hands: E₂ ZATU-752 SAL 3-N57, nourishment rations, SUKKAL, expended from GA + ZATU-753;
- W 20511, 3 (large text, KISIM ZIZ₂, SAL BAR, KAŠ, TUG₂ + BAD + BAD 3x, TUG₂ BUR₂ = similar to KI 3x, TUG₂, ŠU₂, DUR = rolled-up textile in pot?, GA'AR, U₄ 1-NO8 GALGA E₂ BA EZEN + U₂ + A, ŠURUPPAK ZATU-752, EN IB LA₂, SUG₅ SAG AB E₂ SANGA) = 'a merchant?', rations of the House over a time period, on the occasion of a "Feast of Living Water", from the ZATU-752 of Šuruppak, 'weighed' (?) by EN IB, cadastre officer and registrar of the House of the Shrine?'

ZATU-737 + SAL

- W 15771, S = IM 23435.2 (ZATU-737 + SAL, ZATU-753, PA E₂, URUDU MURUB₂ UNUG) = textile- and metal supplies to/from, also the 'cittizennesses' of Uruk;
- W 17729, BP^t = IM 46015 (KUR, ŠA₃ TUR, SAL + KUR ZATU-737 + SAL, EN) = slave women work at ZATU-737 + SAL;

W 20274, 14 = from ZATU-737+SAL, where ZATU-737+SAL is included in ZATU-753, underlying a SANGA; in its turn, this forms part of a GA+ZATU-753 (ZATU-644-A = ←, TUM, SAL BAR, KUR ALAN DA ZATU-737+SAL ZATU-753, SANGA ZATU-753, GA+ZATU 753) = among the items also textile(?) ZATU-644 as offering to ALAN KUR, TUM = lower part of body = fertility ceremony?;

W 21671 (TUG₂ 4x, ŠU₂ 9x, EZEN U₄ AN MUŠ₃ 2x, SIG₂ 5x, EZEN AN SIG MUŠ₃, GADA 8x, BARA₂ 2x, NAGAR URI₃ EN 3x, GIBIL NUN 2x, SU NUN, BA, EN SIG₂ ŠU₂ GADA TUG₂, EN EZEN AN HI, ZATU-737+SAL URI₃) = ZATU-737+SAL of Ur gives out EN's textile products upon EN EZEN AN [in?] HI.

SAL

KU₃: (W 15897, B2 = VAT 16861) (fragment; distribution of goods referring to EN including ŠU₂ and KU₃);

BAR SAL/SAL BAR?, who frequently appear in connection with textile and other goods. This might, or might not, be the same sign as that read by R. Englund as SAL+ŠU₂ (MSVO 4, p. 73):

W 20274, 22 (large text, among the items also SAL BAR, TUG₂ 6x, TUG₂+BAD+BAD 4x, TUG₂ BUR₂ = similar to KI 2x, also GABURRA, DARA₄, TUG₂ BA KU₆ RU RAD, TUG+BAD+BAD DUR₂ = bale? ZATU-751 BU DU₆, TUG+BAD+BAD U₈, ŠU₂, TUG₂ ZATU-756 = 'ladder', last like DUR = rolled-up textile in pot?) = consignment of textiles with instructions for destinations?;

W 20274, 27 (KISIM, SAL BAR, TUG₂ TUG+BAD+BAD, GA'AR, EN GIŠ₃ GIŠ₃ KA, MAŠ ŠE₃, GI) = among the items also textiles for fertility ceremony, GI - 'delivery', 'return?';

W 20274, 45 (TUG₂ 3x, TUG₂ ZATU-756 = 'ladder'3x, SILA₄.C = bale?, PAP, TUG₂ ŠURUPPAK, NAM₂ RAD PA, SAL BAR, BARA₂, DUR = rolled-up textile in pot?, DARA₄ = bale?, GA₂+NI TAR E₂ BA U₄+1-NO8, NAM₂ RAD PA) = 'rations of the House over a time period in a specified store, under authority?';

W 20274, 97 (TUG₂ 2x, TUG₂ BUR₂ = similar to KI, 1-N57 SAL BAR, SAL TUR BAR, TUG₂+BAD+BAD, BARA₂, GA'AR) = commodity list;

W 20274, 115 (SAL BAR, TUG₂+BAD+BAD, NINDA₂+1-NO6+HI.GUNU, NAGA) = textiles for females in packages from/to Naga?;

W 22116, 6 (fragment, BAR SAL, TUG₂);

W 24024.1 (large text, ŠU₂ 5x, ŠU₂ ŠE+NAM₂, BAR SAL, ZATU-759 = mat? 4x, ZATU-753 7x, ZATU-753 TI SAL SUHUR, ZATU-644 3x, GADA GAL ŠAB, 2x, TUG₂ 4x, TUG₂ EZEN GAL, TUG₂ NAM₂ URU, SIG NUN ZATU-782, TUG₂, 1-NO48 2-NO34 3-N14, ZATU-759 SAG) = list of textile- and matting products, for servile personnel?;

GADA:

W 20493, 4 (ŠU₂, TU SANGA, ZATU-644, GADA SAL AL, ZATU-753, U₄+1NO57 GIBIL NUN GA +ZATU-753 GU₇; textile commodities expended from the GA + ZATU 753).

UŠ and SAL

Text ATU 1, 324 = W 7024 (SAL UŠ, 3-NO14 8-NO1 ŠU₂, 1-NO1 ZATU-644, UNUG) = textiles of Uruk.

UŠ

Text ATU 1, 511 = W 1872 (UŠ SAG, ERIM = metalworkers?, URUDU ERIM, ZATU-764 = mats?).

Text W 21278 (SIG₂, TUG₂, GADA, BARA₂, NUNUZ, UŠ+TAR, BAHAR₂, DUR KAK, ZATU-737+SU, SU, ZATU-651 = store with vaulted roof).

W 20274, 80⁺

(large text, TUG₂, GURUŠDA EN, SANGA TU, TUG₂ EN 6x, GUN₃ = a bird? TUG₂ 2x, SIG₂ EN 5x, SIG₂ SANGA, SIG₂ 6x, SIG₂ BA 4x, TUG₂ BA 6x, TUG₂ SIG₂, TUG₂+BAD+BAD 2x, ZATU-719, TUG₂ ZATU-749 = mat?, 4-NO14 6-NO1 EN SIG₂ TUG₂ BA, ZATU-719 ZI ZATU-737+SAL, ZATU 753) = EN's 'rations' of SIG₂ and TUG₂, probably from ZATU-719 and ZATU-737+SAL,

which belongs to ZATU-753).

Texts published in ATU 6 and referring to textiles

W 10585; W 10731; W 10803,b+; W 10846; W 11167,c; W 13662,i; W 14111, a+; W 14353; W 15772,c+; W 15772,d; W 15772,g; W 15774,x; W 15897,b1; W 15897, c2; W 15897, c19; W 16465; W 17926 (transcription only, drawing missing); VAT 15288.

1 For instance, Maggi, Nisbet and Barker 1990; Chang 1993; on animal husbandry in the ancient Near East also Van Driel 1993; Stepień 1996; Szarzyńska 2002; Frangipane 2010, 294–299, 304–307. The nomadic way of life constitutes a theme of a number of recent studies, such as Cribb 1991; Hauser 2006; Seidel and Van der Steen 2007.

2 Sanders and Webster 1988, 541, table 3.

3 Charvát 1997; Charvát 2002; text editions not cited there, or published afterwards, are ATU 3; ATU 5; ATU 6; and MSVO 4.

4 More on this Szarzyńska 2002, 27–32.

5 The forms of proto-cuneiform signs may be consulted in the ‘Cuneiform Digital Library Initiative’ list: <http://www.cdli.ucla.edu/tools/SignLists/protocuneiform/archsigns.html>, cited November 16th, 2012.

6 Charvát 1997, 46, No. W 21418, 8.

7 Charvát 1997, 46, No. W 24012, 9.

8 Charvát 1997, 46–47.

9 Szarzyńska 2002, 54. On the dignity of EN see now Szarzyńska 2011.

10 Warka-Uruk, excavation diary, Fundnummer W 20280, 1–18; Charvát 1997, 46, fn. 497.

11 Finds Nos. W 20281/1, 3, 7, 8, 9, 10, 13, 14 and 15.

12 e.g. Amiet 1961, pl. 14ter: H, pl. 16: 263; and now Rova 1994, 102–103, n. 445.

13 Boehmer 1999, 29–32.

14 Texts Nos. W 20246, 1; W 20274, 30; W 20327, 3; W 20511, 3; see Appendix.

15 Charvát 1997, 47.

16 Texts Nos. W 15771, S = IM 23435.2; W 17729 BP+ = IM 46015; W 20274, 14; W 21671; see Appendix.

17 Texts Nos. W 15897, B2 = VAT 16861; W 20274, 22; W 20274, 27; W 20274, 45; W 20274, 97; W 20274, 115; W 22116, 6; W 24024.1; W 20493, 4; see Appendix.

18 Text ATU 1, No. 324 = W 7024; see Appendix.

19 Text ATU 1, No. 511 = W 1872; see Appendix.

20 Text No. W 21278; see Appendix.

21 Text ATU 1, No. 159 = W 9656, cu.

22 Text No. W 20274, 80+; Charvát 1997, 47; see Appendix; on Uruk-age textile rations Szarzyńska 2002, 43.

23 Text No. W 20274, 21; Charvát 1997, 77, fn. 852.

24 Charvát 1997, 23–24 and 78 fn. 856, for the Uruk text No. W 20274, 34.

25 ATU 6, for a detailed breakdown see Appendix.

26 Texts No. W 11167, c – GA'AR; W 14111, a+; W 15897, b1 – KU₆.

27 MSVO 4, Nos 17, 18, 19, 21, 23, 24, 25 and 26.

28 MSVO 4, Nos 17–19.

29 MSVO 4, Nos 21, 23–25.

30 MSVO 4, 13.

31 MSVO 4, No. 21 and possibly 23.

32 Is this *dur*₂ = ‘sitting’, ‘stationed’?

33 MSVO 4, Nos 19, 25 and 26.

34 MSVO 4, 22, 31.

35 MSVO 4, 9.

36 MSVO 4, Nos 14 and 24.

37 For ED Lagaš cf. Hruška 1995, 81–82.

38 See MSVO 1; also Neumann 1996.

39 MSVO 1, No. 93; MSVO 1, No. 103.

40 MSVO 1, 139.

41 MSVO 1, 149–150.

42 MSVO 1, 152.

43 MSVO 1, No. 172.

44 MSVO 1, No. 115.

- 45 MSVO 1, No. 173.
- 46 Listed in MSVO 1, 32.
- 47 Charvát 1997, 13, fn. 80; in general, Szarzyńska 2002, 12–14.
- 48 See, at the very least, Zettler and Horne 1998; Matthews 1993; for the general context of the Ur sealing finds cf. Matthews 1997; Dittmann 2006; for analyses of particular find categories cf. Müller-Karpe 1993; Rehm 2003; Cohen 2005; Marchetti 2006, 72–83; most recently Šašková, Pecha and Charvát 2010.
- 49 See Sörenhagen 1999; Dittmann 2006, 38–39; Marchetti 2006, 71–83, esp. 72–76.
- 50 Charvát 2005; Charvát 2010.
- 51 Wright 1969, 91; in general on this see Englund 1995; Late-Uruk data, albeit from a different geographical setting: MacMahon-Oates 2007, 167–168.
- 52 From 100 to more than 280 animals, Wright 1969, 121.
- 53 Wright 1969, 105–106.
- 54 Charvát 2010, 56 = UE 3, No. 142; Charvát 2010 p. 57 = UE 3, No. 461; Matthews 1993, Nos 74 and 89.
- 55 Charvát 2010, 57.
- 56 Charvát 2010, 46.
- 57 Charvát 2010, 60–61 = UE 3: 395, with the sign group UR₄ KAB ALAM UR₂ DU₈ = ‘wool fleeces in baskets, statue, fertility ritual performed (or, alternatively, fertility released)’.
- 58 Noted down in Matthews 1993, 74 (UDU UR₄ DUG UR₂).
- 59 See Charvát 2010, 60–61.
- 60 In Charvát 2010, 57; see above, and also Charvát 2011, 54–55.
- 61 UET 2, on the findspot of the texts cf. UET 2, 1.
- 62 UET 2, 6.
- 63 ZATU No. 44, on page 179.
- 64 Steinkeller 1995, 698 under No. 44.
- 65 Carroué 1981.
- 66 Westenholz 1997, 42–43, fn. 20.
- 67 See also UET 2, 6.
- 68 Published as UE 3, No. 395.
- 69 Martin 1988, 55.
- 70 See Waetzold 2007.
- 71 Visicato 1995, 130–131.
- 72 That is, ZATU Nos 186, 207.
- 73 That is, ZATU Nos 232, 217.
- 74 Deimel 1924, Introduction, § 6.
- 75 Martin *et al.* 2001, 61, No. 81. See also Waetzold 1983.
- 76 Visicato 1995, 115.
- 77 Visicato 1995, 125–130.
- 78 Deimel 1924, documents Nos 135, 136.
- 79 Deimel 1924, documents Nos 137, 138, 139, 151, and see below.
- 80 Deimel 1924, document No. 152?
- 81 Visicato 1995, 84–88.
- 82 No. 84; Martin *et al.* 2001, 64–65.
- 83 Martin *et al.* 2001, 116.
- 84 No. 21; Martin *et al.* 2001, 20–21, 33.
- 85 Of the goddess Ninkinnir (?), see Martin *et al.* 2001, 109.
- 86 Martin *et al.* 2001, 112.
- 87 Against Deimel 1924, Nos 30–42, see Martin *et al.* 2001, 77–78, No. 96; Martin *et al.* 2001, 79–80, No. 97.
- 88 UE 3, No. 433.
- 89 IL₂ = Matthews 1993, No. 14.

6. The Value of Wool in Early Bronze Age Mesopotamia. On the Control of Sheep and the Handling of Wool in the Presargonic to the Ur III Periods (c. 2400–2000 BC)

*Walther Sallaberger*¹

1. Export of wool from a farming region

In Early Bronze Age Mesopotamia, in the 3rd millennium BC, textiles were generally made of wool, while linen garments were mostly restricted to cultic use. Herds of sheep could be kept not only in the alluvial plains, but also in the steppe and in the hilly and mountainous regions surrounding the lowlands. Groups specialized in sheep-herding lived primarily in those regions which were less suitable for agriculture. The need for transhumance, annual, seasonal migrations to reach regions with sufficient food for the herds, also conditions a specialized lifestyle. These pastoralists had to live off of their flocks of sheep, using the milk, meat and wool for their own consumption, and exchanging any surplus in the cities to obtain other necessary goods. They thus depended economically on a constant exchange with the agriculturalists living in the alluvial plain. Such an exchange is documented for Old Babylonian (Middle Bronze Age) Mari, for example, in the form of tribute to the state.² Earlier, in the Ur III period at the end of the 3rd millennium, sheep and cattle were sent to Sumer, the southern part of the alluvial plain, from the eastern regions along the Zagros mountains as regular tribute.³ Booty from military expeditions to the mountain lands and to the ‘Mardu land’ often included sheep as well.⁴ Shipments of sheep in the other direction are unknown, whereas barley is exported from Sumer, for example to buy copper, which in the 3rd millennium arrived from Oman via the Persian Gulf.⁵

One might easily interpret this flow of goods as reflecting the economies of greater Mesopotamia: the irrigation agriculture of the alluvial plains produced a surplus of grain, whereas sheep were imported from the hilly flanks or the steppe, which appear less suitable for large-scale farming. To be certain, crops must also have been harvested there, just as the alluvial plains always kept sheep, as attested in written documents. But based on these general patterns of exchange, we face the paradox that Sumerian merchants of the 24th and 21st centuries also sold wool. Moreover, they sold wool itself, not textiles produced in the weaving workshops of the large cities. It would be easier to accept the export of high

quality products from the specialized workshops of the cities, just as the merchants of Aššur sold textiles in Anatolia a few centuries later.⁶ At least some of the goods the Sumerian merchants imported, like honey, minerals, stones, metals, or resins, arrived from or through the Zagros mountains.⁷ This could lead to the impression that wool was sold precisely to those peoples who specialized in sheep-herding. Though the merchants may have sold the wool locally or to the Gulf region (see below), the sale of wool as a raw material instead of finished garments and textiles is puzzling. In addition, wool remained an export good during the Ur III period, when the decline of urban settlements in Upper Mesopotamia might possibly have led to a surplus of wool produced by the pastoralists in the steppe. Nevertheless, evidence for the import of wool cannot be found in the dense textual record.

In the following discussion of this conundrum, I have selected three different corpora of evidence: first, for the Presargonic period (24th century BC), the archive of the Emunus of Girsu, the organization of the wife of the city ruler or king of Lagaš, the ‘Lady of Girsu’, which provides the most comprehensive view of all aspects of the economy; second, the tablets from Tell Beydar, ancient Nabada, in Upper Mesopotamia, which derive from an ecologically different region with a similar socio-economic basis; and third, the massive Ur III evidence (21st century BC), which allows the most detailed investigation. The similarities in the internal organization of society and economy between the Presargonic and Ur III periods have often been pointed out.⁹ Cultural similarities are also reflected in the use of the archaeological designation of the ‘Early Bronze Age’, which includes all of these periods. Cultural continuity is obvious in the continued existence of the same urban centres and their surrounding regions, such as Girsu, Lagaš, Umma, Adab, Ur or Uruk. The early city states became ‘provinces’ of the Ur III state, remaining autonomous in many respects, except for state matters such as the military. With the downfall of Ur, the political landscape changed completely. The city states that dominated the 3rd millennium disappeared and new territorial states emerged. The results of this study pertain to the Early Bronze Age, more specifically to the second half of the 3rd millennium, but similar patterns of control of sheep and their wool were most likely also at work in the earlier city states of the Fara period (ED IIIa) and the Ur archaic texts (ED I/II).

2. Sumerian merchants selling wool

2.1. Merchants in Presargonic Girsu

In the Presargonic city state of Lagaš, wool appears as a trade-good handed over to merchants. In the organization of the Lady of Girsu, the ruler’s wife living in the capital at Girsu, trade activities are only rarely documented, though more should be expected from the archives of the ruler. Wool was used to acquire spices by the merchant Ur-emuš.¹⁰ Wool and silver were handed over to this seafaring merchant¹¹ or, most importantly, consigned together with silver to buy copper arriving from Magan through the Persian Gulf.¹² Wool was apparently one of the most important commodities that Sumerians could exchange to acquire foreign goods. Wool was bartered for barley, which was then sent to Elam.¹³

Discussing the commercial exchange of the household of the Lady of Girsu, which specialized in textile production, R. Prentice writes:¹⁴

One would expect woollen garments to have been an important export product. Lagaš

possessed large herds of sheep and the number of women weaving and spinning¹⁵ was continually growing. However, there is only one document which records the export of textiles.

The one document mentioned by Prentice¹⁶ is *DP 518*, according to which three standard bar-dul₅-garments (probably kilts) were given together with five minas of silver to the seafaring merchant Ijirinibatuš for barter (niḡ₂-sam₂) with Dilmun.

To summarize the evidence from Presargononic Girsu, wool was one of the primary products exported by the Emunus, but the main export good in quantity and number of references was clearly barley, which could easily be shipped to neighbouring regions. Besides locally produced wool and barley, fish, lard and scented oils were also exported.¹⁷

2.2. Merchants in Ur III Umma

Turning now to the end of the 3rd millennium, the period of the Third Dynasty of Ur, the textual evidence allows two perspectives: first, a comparison of sales and purchases executed by the institutional economy of Umma, directed by the governor; and secondly, an evaluation of the accounts of the merchants who provided goods both from local and from external markets.

Purchase of wool	Silver value in shekels	Sale of wool	Amount of wool in talents	Silver value in shekels
a) 43 shekels of silver (AS 1)	43	a) for bitumen (§ 37)	2	≈ 12
		b) for 'merchandise' (§ 47)	9	≈ 54
b) 6 kor of grain (AS 7)	6	c) for grain (AS 3)		10
		d) for dry bitumen (AS 7)	4	≈ 24
c) 25 shekels of silver (§§ 1)	25	e) for gold (AS 7)	115	≈ 690
d) silver for 23 ¼ talents of wool (§§ 2)	≈ 140	f) for eggs (?) (§§ 3)	≈	≈ 1
e) 420 kor of grain (§§ 6)	420			
f) grain for 30 talents of wool ([x])	≈ 180	g) for a woman, 2 children (IS 2)	3	≈ 18

Table 6.1. Wool bought and sold by the governor's institutional economy at Umma in chronological order:

Values are rounded. Estimated prices (indicated by ≈) are calculated according to the standard price relationship of ¹/10 shekel of silver per mana of wool, or 6 shekels of silver per 1 talent (following Snell, 1982, 178–179).

References for the purchase of wool: a) MVN 18, 125; b) Nisaba 11, 17 i 18–19; c) TCL 5, 5680; d) MVN 1, 241; e) TCL 5, 6037; f) Nisaba 11, 6 iv 3–4. 6.

References for the sale of wool: a) AAICAB 31 Ashm. 1911–217, b) MVN 1, 220; c) Studies Jones 216:15–17 (11th month, i.e. period before harvest with shortage of grain), d) and e) NATN 805; f) Nisaba 9, 46; g) AAICAB 41f. Ashm. 1911–237b.

References from Wilcke (2008,267–281), with one addition (sale reference c) taken from Ouyang (2013, 239–241, table 5.2.C: Wool received by Umma merchants; and 292–294, table 5.2.M-2: Animal parts and by-products supplied by Umma merchants).

The references to wool in institutional purchases and sales are extracted from the lists provided by Wilcke (Table 6.1).¹⁸ Concerning the balance between wool sold and bought in these references, the conclusions drawn by Ouyang on the purchase of wool are worth citing in full:¹⁹

A shortage of wool in the institutional sector might have led to this demand, for the supplies of wool from the merchants appear documented during the reign of King Šu-Sin, when they received only small amounts of their capital.

The administrators, who withdrew wool from the merchants, at the same time took wool from the institutional economy in Umma to meet their needs. [...] These wool transactions suggest that incidental shortages could have compelled the Umma institutional economy to fall back on the merchants for supplementary supplies of goods in which it specialized. The evidence does not point out the source of the wool purchased by the merchants though.

So it seems that temporary shortages forced the governor's organization to buy wool from another source, probably other organizations within the same or another province. Importantly, the highest amount of wool spent by Umma's administration was used to buy gold, the most precious metal of the period and therefore used to fulfil the demands of annual taxes to the state. Wool was also exchanged for bitumen, which was imported from Madga in the Eastern Tigris region, somewhere in the area of the modern oil-producing centre of Kirkuk, the region where most researchers would localize a centre of the Mardu (Amorite) land.²⁰ In these cases, wool was clearly invested in the superregional market, since gold and bitumen had to be imported to Sumer.

Date	Capital, total (sa ₃ ni ₂ - gur ₁₁ -ra-kam) in shekels (rounded)	Silver value of wool in shekels (rounded)	Percentage of wool as part of the capital (rounded)	Merchant	Text
AS 3/01	927	262	28%	Ur-Dumuzida	<i>Studies Jones 216</i>
AS 4/-	846	300	35%	'merchants', dam-gara ₁ -ne	TCL 5, 6046
AS 4/-	413	238	24%	Ur-Dumuzida	<i>Ledgers no. 3</i> = YOS 18, 122
AS 5/-	228	40	16%	Enimanizi	TCL 5, 6052
AS 5/-	156	40	26%	Pada	<i>Ledgers no.4</i>
AS 5/-	201	40	20%	Seskala	TCL 5, 6056
AS 5/-	77	40	52%	Seskala	<i>Ledgers no. 6</i>
AS 5/11	267	117	44%	Pada	AAICAB, Ashm.1924-0667
AS 6/-	113	33	29%	Kateša	SNAT 365
AS 6/02	[233]	40	17%	Kuda	<i>Ledgers no. 8</i>
AS 6/11	197	85	43%	Seskala	<i>Nisaba 6, 2</i>
AS 6/11	271	120	44%	Pada	STA 23
AS 6/11	369	228	62%	Ur-Dumuzida	<i>Ledgers no. 9</i>
AS 7/07	265	151	57%	Ur-Dumuzida	<i>Ledgers no. 10</i>
AS 7/09	252	88	35%	Pada	<i>Ledgers no. 11</i>
AS 8/07	304	96	32%	Ur-Dumuzida	STA 1
AS 9/-	869	331	38%	Ur-Dumuzida	YOS 18, 123
ŠS 2/-	336	25	7%	Ur-Dumuzida	TCL 5, 5680
ŠS 5/-	13	2	13%	Pada	<i>Ledgers no. 12</i>

Table 6.2. Wool belonging to the capital of merchants employed by the governor of Umma (Ur III) in balanced accounts about merchants. Values are rounded. References in Ouyang 2013,239–240, table 5.2.C, which also includes other documents.

The distribution of sales and purchases of wool agrees with the fact that wool appears as one of the staple goods of the province of Umma that were handed over to merchants travelling on behalf of the state. The balanced accounts written to control the business of the merchants not only provide the quantities and value of wool spent, but allow us to calculate the amount of wool in the merchants' capital: Between 7% and 62%, mostly a quarter to half of the capital given to merchants, came from wool (see Table 6.2). Interestingly, garments or textiles never appear as capital goods. Only the raw product, the wool itself, was used by the merchants to

acquire goods. Besides silver, goods handed over to the merchants included barley, dates, fish and fish oil, sheepskins and leather products, wood, sesame oil, or alkaline plants and various foodstuffs.²¹

In three cases, the Umma scribes indicated the goods the wool was budgeted for. Once, Seskala should supply ku-mul, 'fennel, anis'(?),²² a plant that was also grown locally. In two other instances, the merchant had to buy gold for wool, in each case for an amount of 5 talents of wool, worth 30 shekels of silver.²³ Again, as in the cases collected in Table 6.1, wool was invested to import gold to Sumer.

Besides gold, the merchants imported silver by selling staple goods on foreign markets, furthermore metals, especially copper and tin, alkaline plants, gypsum, bitumen, honey,²⁴ and resins, which partly came from foreign regions. Wool, which was provided mostly by the governor himself, his wife (Ninmelam) and more rarely by officials,²⁵ was thus invested in interregional trade.

It can be assumed that the goods traded by the merchants were usually transported by boat on the rivers and canals and on the sea to Elam or other regions via the Persian Gulf. Although wool was one of the main products sold by the Umma merchants (see Table 6.2), it did not serve as means of payment in the same way as silver or, to a lesser degree, barley: wool is not mentioned as a price in sale documents or as a commodity in loans.

The role of wool as merchandise in some respects recalls the Old Babylonian situation that merchants sold the wool yielded by the state's herds.²⁶ Perhaps the wool business explains the background of one of the best known money-lenders of the Ur III period, S_{1.A}-a, who was a nagada 'shepherd' by profession.²⁷

3. The urban control of sheep herds in Upper Mesopotamia: Presargonic Nabada (Tell Beydar)

As the preceding section has shown, wool for trade was provided by the communal organizations that managed the economy in Early Bronze Age Mesopotamia, in these instances by the palace of the city-ruler or the Lady of Girsu's organization in Presargonic Lagaš, and by the governor and his officials in Ur III Umma. The control of flocks of sheep by such organizations is attested in hundreds, probably thousands of cuneiform documents from all over third-millennium Mesopotamia. Excellent evidence for the control of flocks of sheep comes from Tell Beydar, ancient Nabada.

Nabada was a second-rank city in the Habur plain in Upper Mesopotamia, dependent on the political capital at Nagar (modern Tell Brak), and it housed roughly two thousand inhabitants at the time covered by its main archive in the early 24th century BC.²⁸ The inhabitants lived in small houses, where they also prepared their food, especially on the basis of barley, which they received as monthly allocations from the communal organization. As was common in early Mesopotamia, from Sumer in the south to Upper Mesopotamia in the north, they worked collectively both in the fields and in the workshops, and the harvested grain was stored in communal granaries. Life was thus determined by collective labour and private food consumption. An important source for our understanding of sheep husbandry is provided by a group of 18 round small tablets, 3.5 to 4.5 cm in diameter.²⁹

Herdsmen	Total	Sheep	Rams/ wethers	Ewes	He-goats	Lambs	Text Subartu 2 and 12
<i>type 1a</i>							
<i>ir-ib-sá-lim</i>	97	82			1	14	161
<i>Á-la-gi-mu</i>	164	138			4	22	162
<i>Ma-ti</i>	165	113			2	50	152
<i>Su-na-na</i>	168	129			1	38	151
<i>An-na-kun</i>	201	165			2	34	118
<i>Gi-la-nu</i>	211	1 [?] 60			2	49	167
<i>type 1b</i>							
<i>Á-sá-lum</i>	165+		20+	105		40+	164
<i>A-hu-du₁₀</i>	253		60	139	1	53	166
<i>Ur-il</i>	286			219		67	155
<i>É-GAL</i>	306		100	160	–	46	153
<i>Lu-sá-lim</i>	331		100	185	3	43	158

Table 6.3. Flocks of sheep at Nabada/Tell Beydar according to herd inspection documents. Following Sallaberger 2004, 19, table 4.

The texts maintain the following form:

1. Type of small livestock (sheep or goats)
2. personal name
3. number of animals
4. further types of sheep (sheep texts only) and respective numbers
5. month name (except once ‘Month of the Sun-god’).

In tabulated form, these texts provide information on the composition and size of the herds of sheep at Tell Beydar (Table 6.3).

The persons named are the shepherds, who cared for the flocks entrusted to them by the communal organization of the city of Nabada. The flocks were of a perfect size to be managed by one person, consisting of 160 to 300 animals. The relatively high rate of male animals (relation of rams or probably more often wethers to ewes lies between 1:1.6 and 1:2.3) indicates that they were kept not only for husbandry, but primarily for wool production. There is no evidence at all that sheep cheese was delivered. The flocks of sheep also appear in another group of similar documents (Table 6.4), small tablets recording the amounts of wool plucked (ur₄) from the sheep and all dated to the ‘Month of the Sun-God’, thus clearly to be identified with the period of plucking and revision of the herds. The texts most likely date to a span of one or at most two years.

Finally, the shepherds appear in lists concerning the delivery of sheep for slaughter or of hides to the management. The documents kept in the centre of the city³⁰ and written by the urban scribes demonstrate that the flocks of sheep belonged to the communal organization of Nabada, and that the shepherds were thus considered an integral part of the urban community. The small documents on the inspection of herds allow us to calculate the average size of a flock. Consequently, the total number of shepherds known from larger lists of persons allow for a conservative estimate of the total number of sheep controlled by Nabada as comprising c. 4000 heads (and a slightly smaller number of goats).

Personal name	Total	From sheep	From rams or wethers	From ewes	Text Subartu 2 and 12
Ā-ša-lum	463 (minas of) wool + 3 'free of fleece' ¹	463			103
Bù-[EN]	102+ (minas of) wool	102+			51
Dab ₆ -ra	113 (minas of) wool	113			95
E-GAL	457 (minas of) wool		200	257	82
E-GAL	526 (minas of) wool + 5 'free of fleece'	526			60
Īr-īb-sá-lim	196 ² (minas of) wool + 4 'free of fleece'	196 ²			61
Kūn-BAD	580 (minas of) wool + 4 'free of fleece'	580			50
URI-APIN	923 (minas of) wool + 24 'free'		400	523	56

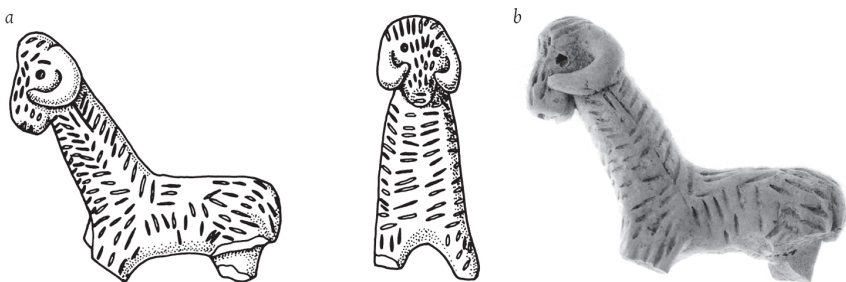
Table 6.4. Small round tablets documenting flocks of small cattle (Excerpted from Sallaberger 2004, 14, table 1); minas of wool, probably representing a. ratio of 2 minas of wool per ram or wether, 1.5 minas per ewe (Sallaberger 2004, 20).³¹

	Number of animals attested in individual documents	Average size of flock	Additional herdsmen	Estimated additional animals	Estimated total (low estimate)
Sheep	2347+ in 11 flocks	213	7	1491	c. 3840 in 18 flocks
Goats	2072 in 7 flocks;	296	5	1480	c. 3550 in 12 flocks
Total	4419+ in 18 flocks;		12	2971	c. 7400 in 30 flocks

Table 6.5. Total number of sheep and. goats kept by the local administration of Nabada. From Sallaberger 2004, 20

In the environment of Tell Beydar, fallow land and fields provided fodder after the harvest. During the humid season in winter and spring the flocks could stay in the hills stretching to the west, and one could also imagine a seasonal transhumance to the Jebel 'Abd al-'Aziz.³¹

According to the textual documentation, the pastoralists of Upper Mesopotamian Nabada were integrated in the urban communal management. There is even further evidence that the animal herds were an essential part of the urban perspective on their world, and this evidence comes from an unexpected side, namely the find of zoomorphic terracottas. Alexander Pruß's analysis of the terracotta figurines found in private houses excavated at Tell Beydar showed that depictions of domestic animals clearly outnumber those of wild animals (bears, foxes, lions). Local differences can be noted, however. More bovine figurines are attested in the Euphrates valley, which is more suited for cattle breeding, as also attested by the finds of animal bones. Equid figurines predominate in the capital at Nagar/Tell Brak, which concentrates on this sector of the palace economy. In the Habur plains, sheep are more prominent than in the Euphrates valley. Whatever the function of the terracottas may have been, they illustrate the personal view of the inhabitants on their environment. Whether the terracottas represent magical figurines or toys, both uses would represent an ideal world. In this way the high number of sheep and goat figurines within the city attests to the social integration of shepherding in urban society.³²



Figs 6. 1a and b. Figurine of a ram from Halawa from the 24th c. BC ('EB IVA', courtesy A. Pruß: Pruß and Link 1994, 114; 125, Abb. 35 and Taf. 16, there Schaffterrakotte Nr 79 (HLW.78T121)).

Can we assume that independent nomadic or pastoralist groups migrated in the same region, the Habur plains? The dense settlement in that period, well documented by archaeological surveys, precludes such an assumption. The space necessary for the sheep and goats of Nabada corresponds to about half of the province's total surface; this leaves little room, if any, for independent groups, especially if one allows for cattle, equids, and royal herds as well.³³ The 24th-century situation in the Habur plains thus is directly opposed to the situation in the same region half a millennium later in the Old Babylonian period, the Middle Bronze Age, when the region was predominantly inhabited by pastoralists, as attested in the written sources and confirmed by the archaeological evidence.³⁴

The tablets from Tell Beydar document the strict control of animal herds by the urban organization, and this control included the exact number of sheep entrusted to the shepherds and the weighing of the wool plucked every spring. Furthermore, the loss of sheep was registered by the tally of hides from shipments delivered by shepherds.³⁵

The subsequent use of the plucked wool is not attested in the textual documentation from Tell Beydar. Industrial production of textiles is often linked to the royal sector, and so the wool may have been delivered directly there.³⁶ Similarly to the Presargonic archive of the Lady of Girsu, a single document from Nabada attests to the sale of wool. Interestingly, as at Girsu, wool is sold by fleeces in order to obtain a luxury good, namely wine, a delicacy in ancient Mesopotamia.³⁷

4. The urban control of herds of sheep on the alluvial plain: Presargonic Girsu, Ur III Umma, Girsu, and Ur

4.1. Presargonic Girsu

Turning from Upper Mesopotamian Nabada to the contemporary southern archive of the Lady of Girsu, we note both parallels and differences. First, shepherds of sheep raised for wool (*sipa udu siki-ka*) are part of the workforce of the organization, and up to three shepherds appear together with six herding assistants.³⁸ The size of their herds cannot be ascertained, since only small numbers of sheep, around 40 to 60 heads, appear in lists of barley as fodder. This suggests that these animals were earmarked for slaughter. As with the Nabada lists of hides, the shepherds of Girsu also had to document all losses by returning hides

for fallen animals.³⁹ The few preserved tablets that deal with plucking (ur₄) list only surprisingly low numbers for the three or four shepherds, such as 42 (VS 25, 55), 63 (DP 258), or 68 (VS 14, 73) sheep. These texts, however, deal with special taxes for sheep,⁴⁰ and, in contrast to the Nabada documents, do not record the total amount of wool plucked.

Interestingly, the Emunus organization housed both shepherds and female textile workers, but apparently did not control the wool itself. Although the documentation covers practically all aspects of subsistence economy, it does not mention the plucking of wool, its storage or its processing. These aspects were apparently reserved for the palace of the ruler, and this is in line with the value of wool, which was handed over to traders as merchandise (see Section 2.1 above). This again dovetails with the Tell Beydar documents: although there the wool was plucked locally, it then disappeared from the records, probably because it was handed over to the palace. An impressive contemporary example of the palatial management of the valuable commodity of wool stems from the archives of Ebla, whereas the second-rank town Nabada and the subordinate Emunus organization were involved in the production, but not in the ultimate control of wool.⁴¹ Taken together this suggests that wool was regarded as a valuable good treated by the palatial economy.

4.2. Ur III Umma

The abundant evidence from the Ur III period allows for an in-depth analysis of sheep husbandry and the production of wool. Only two aspects will be discussed here: the institutional control of herds of sheep kept for wool and the types of sheep bred. This and the subsequent sections on the Ur III period are based on excellent studies on the terminology of sheep-raising in the Ur III period,⁴² the organisation of animal husbandry at Umma,⁴³ and the production of wool.⁴⁴ Animals kept for slaughter as documented in the royal archives of Puzriš-Dagan (modern Drehem) are not of concern here.

‘Fat-tailed sheep’	udu GUKKAL	1,939	44%
‘Sumerian sheep’	udu eme-gi	2,150	49%
‘Black sheep’	udu gegge	289	7%
<i>Total number of sheep</i>	udu ħi-a	4,398	100%

Table 6.6. YOS 4, 237 vii (Umma ŠS 7), distribution of types of sheep.

At Ur III Umma, the herds of the governor (ensi₂) contained two types of sheep. The first type was called ‘native’ or ‘Sumerian sheep’ (udu eme-gi),⁴⁵ while the second type was usually called ‘mountain sheep’ (udu kur-ra), only exceptionally referred to as ‘fat-tailed sheep’ (GUKKAL).⁴⁶ The most important document is an inventory of Umma’s sheep and goats that were handed over by the governor Aiakala to his successor Dadaga in the year Šu-Suen 7 (see Table 6.6).⁴⁷

The total of 4,398 sheep seems quite modest, especially compared to the Presargonic second-rank town Nabada with an estimated number of 3,840 sheep. This cannot be explained by the different environmental conditions, since other towns in the southern alluvial plain show impressively high numbers of sheep,

namely Girsu (Table 6.8, *TUT* 27: 74,533 sheep) and, especially, Ur (Section 4.4 below: an estimated 320,000 sheep). Only institutional differences explain the low numbers, namely that only a part of the governor's herds was listed here; the governor of Umma was, as stated above (Section 2.2), the main provider of wool for the merchants.

The low number of 'black, dark sheep' (udu gegge(Mi), less than 7%) is a confirmation that the two standard sheep types, the 'fat-tailed' (49%) and the normal 'Sumerian' sheep (44%) were of white or light colour. The least valuable type of wool, 'black' or 'dark' wool was always put at the end of lists. Wool was usually 'white, light'; wool was often not dyed in this period.⁴⁸ The grouping of the governor's herds according to color impressively demonstrates that obtaining and keeping white sheep was an aim of the control of the herds and their breeding. Among the two types of sheep, the 'Sumerian' and the 'fat-tailed' or 'mountain' sheep, the latter provided more and better wool.⁴⁹ As the designation indicates, the 'mountain' sheep, opposed to the 'native' or 'Sumerian' sheep, came from the eastern hilly flanks and mountains (called kur in Sumerian). The designation as 'fat-tailed' explains that these were the typical sheep of migrating pastoralists. The price of their wool also differs: a talent of 'Sumerian wool' (siki (eme-)gi) was worth only around six shekels (from 4.75 to 7.5) for, while a talent of 'mountain wool' (siki kurra) was sold for c. eight shekels (6 to almost 9.97).⁵⁰

As the unique document YOS 4, 237 shows, the governor's flocks of sheep were held by the temples of the province (Table 6.7).⁵¹ This information is of crucial importance for the historical dimension: the temples cared for the subsistence economy, farming, and animal husbandry. In this way, the economy of Sumer remained stable despite political changes and turmoils. Thus the Ur III state mainly represented a new overlying structure, which despite its general influence left the base intact.⁵² In YOS 4, 237, one and the same overseer could be responsible for herds in various temples, indicating that the actual management by the province and the governor (ensi₂) did not simply duplicate the grouping of animals through the temples.

Temple	Fat-tailed sheep	Sumerian sheep	Black sheep	Foremen (ugula)
Šara	147	945	–	Kaš
Ninura	1,520	1,120	–	Ure'e
Sulgi	–	56	–	
Inana of Zabalam	–	–	205	
Gula of Umma	–	29	–	
Inana of Ibgal	–	–	68	
(Nin-)E'e	–	–	–	
Ninhilisu	–	–	16	Urnungal
– (directly under governor, ensi ₂ ?)	272	–	–	

Table 6.7. Distribution of types of sheep according to the temples of the province of Umma in YOS 4, 237 (§§ 7). Herds of goats listed in the same text are not included.

The distribution of animals among Umma's temples (Table 6.7) leads to two interesting observations. The majority of fat-tailed sheep, 1,520 heads, or 78%, belonged to Ninura, the wife of Umma's patron god Šara. This breed provided wool of higher quality, and the textile industry was usually situated within the lady's organization, here apparently represented by the temple of Ninura. Secondly, it is noteworthy that black sheep are kept separate by the temples of Inana and of Ninhilisu, apparently an Inana figure, although the consequences of this distribution remain unclear to me.

ASJ 18, 159 no. 3: 16–18 (undated): Document about the ‘possession of the governor’s son within Girsu’ (nin₂-gur₁₁ dumu ensi₂-ka ša₃ njr₂-su⁴⁰), including:

Fat-tailed sheep	udu GUKKAL hi-a	1,059
Sumerian sheep	udu eme-gi hi-a	2,607
Fattened sheep and goats	udu maš, niga	36

TUT 27: 10¹-r.8 (section dated to AS 2): Sheep in Girsu, subscript not preserved

‘Within Girsu’	Ewes (u ₆)	Rams (udu ninta ₆)	Female lambs (kir ₁₁)	Male lambs (sila ₁ ninta ₆)	Judas goats (maš, san)	Total:
						74,533
Fat-tailed sheep (udu GUKKAL)	21,308	18,999	5,595	5,588	861	Total: 52,351
Sumerian sheep (udu eme-gi)	8,362	6,928	2,640	3,605	647	Total: 22,182

BPOA 2, 1882 (Šulgi 43): ‘Total of fat-tailed sheep stationed and their wool, within Girsu; overseer: herding controller Luduga’ (kilib₃-ba udu GUKKAL gub-ba u₆ siki-bi, ša₃ njr₂-su⁴⁰, ugula lu₂-du₁₀-ga šuš₃). The percentage of losses corresponds to an average lifetime of sheep of 4–5 years.

‘stationed’	gub-ba-am ₃	47,716 sheep
‘their wool’	siki-bi	1,480.3 talents = 44,409 kgs
‘dispensed’	zi-ga-am ₃	2,196 sheep
losses (lit. ‘collected’)	de ₃ -de ₃ -ga-am ₃	11,158 sheep
‘outstanding’	la ₂ -ni-am ₃	1,008 sheep

Table 6.8. Examples for ‘Sumerian’ and ‘fat-tailed’ sheep and. the control of flocks of sheep in Girsu documents

4.3. Ur III Girsu

The distribution of the two types, ‘Sumerian’ and ‘fat-tailed’ sheep, is similar in the province of Girsu, although this is rarely explicitly noted (see the two examples in Table 6.8). The control of these types and the production of wool seem to be largely comparable to Umma.

Documents from Girsu mention ‘herding assistants for the fat-tailed sheep’ (gab₂-us₂ (udu) GUKKAL) relatively often. They also receive grain rations (e.g. ASJ 3, 176 no.177), again indicating that employees of the communal organization cared for the fat-tailed sheep.

4.4. Ur III Ur

From Ur III Ur come two large tablets listing a complete income for what must have been a royal textile administration, as suggested by the role played by Ešnunna and other state centres as well as by the appearance of the royal ladies Abi-simti and Bizua in the texts (Table 6.9).⁵³ The total amount of wool delivered in one year is around 8,000 talents, which must have been collected from c. 320,000 sheep.⁵⁴ The two documents name the two standard breeds of sheep, namely ‘Sumerian’ and ‘fat-tailed’ sheep. The difference in wool quality is reflected in their heirarchical listing, with the shepherds of fat-tailed sheep delivering more than twice or even thrice the sum of those of the Sumerian sheep.⁵⁵ Since they were called ‘shepherds’, the herdsmen themselves were directly subject to the royal

administration. These texts indicate that most wool was already sorted at the spot where the plucking took place.

	UET 3, 1505 ([IS 1])		UET 3, 1504 ([IS 2])	
'Capital' (total)	saj nin ₂ -gur ₁₁ -ra-kam	13,751+	[...]	16,000+
a) Remainder from previous year	(of ŠS 9)	5,727	[...]	[...]
b) 'From the shepherds of the fat-tailed sheep'	ki sipa udu GUKKAL-[na]-ke ₄ -ne-ta	3,603	ki sipa udu GUKKAL-[na]-ke ₄ -ne-ta	c. 3,000 ^{ff}
= b1) 'sorted at the plucking place'	igi saj-ija ₂ ki zu ₂ -si-ka	3,527		
+ b2) 'sorted in Ur'	igi saj-ija ₂ ša ₃ urim ₃ ^{ki} -ma	66		23
c) 'From the shepherds of the Sumerian sheep'	ki sipa udu eme-gi-ke ₄ -ne-ta	1,424	ki sipa udu eme-gi-ra-ke ₄ -ne-ta	867
d) 'Wool of the highland fat-tailed sheep'	siki udu GUKKAL igi-nim-ma	688	udu GUKKAL igi-nim-ma	870
e) 'wool in Ešnunna, from the governor Ituraya'	siki ša ₃ aš ₂ ¹ -nun-na-ka, ki [i]-tu-ra-a ensi ₁ -ta	9	siki udu aš ₂ ¹ -nun-na ^{ki} -ta, ki [i]-tu-ra-a ensi ₁ -ta	8
f) 'wool from sheep of Girsu'	siki udu njir-si ^{ki}	33		
= f1) 'at the plucking place'	ša ₃ zu ₂ -si-ka	2		
+ f2) 'in Ur'	ša ₃ urim ₃ ^{ki} -ma	31		
g) 'wool brought from the palace' or 'wool for cultic mašdaria-deliveries and from the palace of (the predecessor) Šu-Suen'	siki e ₂ -gal-ta de ₆ -a (via 6 persons)	8	siki maš ₂ -da-ri-a and e ₂ -gal dš ₂ -zu ₂ -en-ta (via various persons)	5
h) 'royal dedication, from various legacies'	a-ru-a lugal e ₂ -du ₆ -la dili-dili-ta	206+ ⁴⁶		[...]
including h1) 'sorted in Ur'	igi saj-ija ₂ ša ₃ urim ₃ ^{ki} -ma	46		
i) 'various dedications' or 'dedications for Suen'	a-ru-a dili-dili-ta	18	a-ru-a dš ₂ -uen	47
j) 'from the fattening pen'	e ₂ gurušta-ta	11		
k) 'from the overseers of the weavers'	ki ugula uš-bar-ke ₄ -ne-ta	275	ki ugula uš-bar-ke ₄ -ne-ta	276
l) from various organizations		6		172

Table 6.9. Wool from various sources according to UET 3 1504 (IS 2) and. 1505 (IS 1).

The designation 'wool from fat-tailed sheep from the highlands' (siki udu gukkal igi-nim-ma) deserves special attention. Would this hint at wool from foreign pastoralists? Evidently in this context the term 'highlands' (igi-nim-ma) does not refer to the place where the animals were kept, but to the special type of 'highland sheep' (udu igi-nim-ma).⁵⁶ Such wool was, for example, plucked in the region (ma-da) of Adab.⁵⁷ Furthermore, flocks of Ur were sometimes stationed at various places, but as far as one can see, only in the floodplain. Documents from Girsu also attest to the local care of royal herds.⁵⁸ All this evidence thus suggests that, despite the term 'highland sheep', the wool listed in the two major accounts from Ur (and in similar documents) was never plucked in the highlands.

To summarize the evidence, the picture from various Ur III provinces is fairly consistent: the flocks of sheep under their shepherds stayed on the alluvial plain, they were strictly controlled by the standard organizations of Sumer, primarily the temples, and fat-tailed sheep were the more prominent type in wool production.

5. The absence of other pastoralists, 'nomads' or Mardu in the wool business

The textual sources demonstrate that the wool used in Sumer came from the herds of sheep controlled by the communal organizations. Wool was not bought from

outside, and although animals were sent from the periphery,⁵⁹ the hills and mountains in the east, a region most suitable for animal breeding, there is no textual hint that wool was imported. On the contrary, wool was still exported from Sumer in the Ur III period.

This is all the more surprising since the Amorites, called Mardu in Sumerian, were at the same time present in regions stretching from the east to the north of lowland Mesopotamia. Booty from the 'Mardu land' (kur mar-du₂) included animals,⁶⁰ but they did not deliver wool. The designation of an ethnic group as Mardu must have had a basis in reality for the inhabitants of Sumer. The characterizations of the Mardu in the literary texts together with various other features shows that the term 'Mardu' had a very general meaning, oscillating between the meanings 'westerner' and 'nomad'.⁶¹ This vague term certainly implies different regions of habitation or various forms of nomadism. The specialized lifestyle also influenced the ethnic culture, including language as a most notable feature. To avoid misunderstandings: my main intent in translating Mardu as 'nomads' is not to give a modern description, but to paraphrase the ancient term in a meaningful way so that most contexts are aptly covered. It is less important if the Mardu also lived a sedentary life, whether their language was the same as that of the city-dwellers and farmers or not, but apparently their social and economic independence of the urban institutions and organizations led to a perception of 'nomads' as different ethnic groups in the eyes of the urban population, the social group to which we owe the written documentation.

The appearance of the Mardu at the end of the 3rd millennium can, in my view, still be best described as an ethnogenesis, intrinsically linked to the large-scale transformations in land-use well documented for Upper Mesopotamia.⁶² The states of Upper Mesopotamia never recovered from the struggles at the end of the Presargonic period, many settlements in the Balikh and Habur plains and adjacent regions were reduced in size or deserted, and by the end of the millennium, fewer and smaller settlements were left in Northern Mesopotamia.⁶³ The substantial transformations become evident by mapping the political centres of Upper Mesopotamia and Syria in the Ur III period: no first rank centre was any longer situated in the Upper Mesopotamian plains, a region that had still been of importance for the kings of Akkade. This is the region that was inhabited by sheep-breeding pastoralists early in the 2nd millennium.

In the administrative documents of the Ur III period, the Mardu appear as persons who predominantly deliver a special type of sheep to the royal organization at Puzriš-Dagan, namely fat-tailed sheep – the type that was kept for wool in the temples and other communal organizations of Sumer (see Section 4 above). This agrees nicely with the charges of animals designated as gun₂ ma-da 'tribute of the land', which arrived at Drehem from the eastern hilly and mountainous regions, the main area inhabited by the Mardu. But why did comparatively few fat-tailed sheep arrive from the herds held at Sumer?⁶⁴ The answer lies in the specific use of the animals: at Puzriš-Dagan animals were most often ear-marked for slaughter, a fact that may have saved the wool-bearing sheep from Babylonia. Perhaps the fat-tailed sheep from the Amorites were considered as gifts from outside that were then integrated into the herds of sheep?

Although it can reasonably be assumed that groups of pastoralists, living a nomadic, semi-nomadic or sedentary life to the north and east of lowland

Mesopotamia, obtained wool in large quantities, neither Mardu nor other foreigners are attested as producers or suppliers of wool in the Ur III corpus.⁶⁵ Some Mardu also served Ur III institutions and took over various functions in the control of persons, animals, and farming,⁶⁶ like other persons designated as lu₂-_ηes₃tukul 'weapon-bearer', sugal₇ 'assistant', or aga₃-us₂ 'gendarme'.⁶⁷ This set of data thus also excludes that Mardu were producers of wool in Mesopotamia.

In conclusion, the wide-spread opinion that pastoralists inhabiting the steppes and mountains around the Mesopotamian lowlands lived on the sale or barter of their products, including wool, to the farming regions cannot be confirmed by the textual evidence from the Ur III period. In reaching this conclusion, we concentrated on the ethnic group designated as Mardu, since this offered the best chances of finding relevant data. The absence of such an exchange in the sources may lead to two conclusions: either there existed no such specialized pastoralists living off their herds in the regions adjacent to the Ur III empire, or the exchange was restricted to areas that were not covered by written documentation. Both conclusions agree in that independent pastoralists did not play an important role in the institutional economy of the Ur III state.

6. Control and organized labour for high quality wool

Finally, how can we explain the economic success of the Early Bronze Age cities in the production of wool? Their flocks of sheep yielded enough wool (Sections 3 and 4) so that instead of receiving it from pastoralists or neighbouring regions, at least at the end of the 3rd millennium (Section 5), the merchants of Sumer sold locally produced wool (see Section 2).

Two factors may at least partly explain this phenomenon:⁶⁸

1) the control of the flocks of sheep

2) the labour invested in sorting wool

Ad 1) The strict control of the flocks of sheep by the urban organizations is attested in documents such as those presented above in sections 3 and 4.⁶⁹ The control of the herds included crossbreeding with wild sheep,⁷⁰ and certainly led to the best breeding results, most notably the control of the white colour (see above 4.2).

The flocks of sheep of the communal organizations in the city-states and provinces were kept by their shepherds, who apparently migrated to find suitable pasture. Ur III documents from Girsu indicate that some central control of these flocks was necessary, since officials received a free meal when they were on the way to the sheep; this disbursement of bread and beer is registered in the so-called messenger texts. In particular, the transfer of herds of sheep or the crossing of a river required additional workforces throughout the year.⁷¹ Attention was paid to the plucking of wool, which according to these documents mostly was prepared and took place in the 10th to 12th months of the local calendar, i.e. around January to March (Table 6.10). The people commissioned with plucking and in charge of the wool included armed men and people of high status, even a prince, Etel-pû-Dagān. The value of the collected wool called for special care, and most references to the transport of wool date to the second and third months, i.e. after harvest around May to June.⁷²

Plucking usually took place in springtime, around harvest, so the animals may

also have returned from their winter pastures to stay in the harvested fields.

Ad 2) As Waetzoldt has pointed out,⁷³ women undertook the laborious task of plucking the sheep. They may be called simply ‘(working) women’ (geme₂), but are sometimes specifically designated as ‘female weavers’ (geme₂ uš-bar), as, for example, in a Girsu document that lists 816 female weavers under their overseers.⁷⁴ As the large accounts of the income of wool from Ur (Table 6.9)⁷⁵ show, most of the wool was ‘sorted’ (igi saṇ-ṇa₂) either in Ur or at the place of plucking. The inspection and sorting of wool requires technical skill and a large workforce. Most instructive is the list of people stationed between Girsu and Guaba ‘to inspect wool’ (siki igi kara₂-de₃): 600 ‘female weavers’ (geme₂ uš-bar), 12 ‘textile workers’ (LU₂.TUG₂), 8 ‘overseers of the weavers’ (ugula uš-bar), and 8 ‘drivers, skippers’ (ra₂-gaba).⁷⁶

Task: ‘gone ...’		month(/ ^{day}) (01 ≈ April)		
‘... to pluck sheep’	udu ur ₄ -de ₃ ṇen-na/tuš-a*		10, 10/ ¹⁹	11*
‘... to pluck fat-tailed sheep’	udu GUKKAL ur ₄ -de ₃ ṇen-na		10	
‘... to pluck(!?) sheep’	udu ur-ra-de ₃ ^{acc?} ṇen-na			11/ ¹³ , 11/ ²⁶
‘... to pluck sheep; ... way(?) to the fields(?)’	udu ur ₄ -de ₃ ṇen-na DU u ₂ -gara ₃ -še ₃ ṇen-na	06		
‘... to pluck sheep, to Uru’a’	udu ur ₄ -de ₃ ^{u2} URU×A ^a kl-še ₃ DU-...	07		
‘way of plucking’	ṇiri ₃ zu ₂ -si		10	
‘... to the plucking’	zu ₂ -si-še ₃ ṇen-na v.s.			11, 11/ ¹³ , 11 ² / ²¹ , 12, 12/ ²³
‘... to the plucking of fat-tailed sheep’	zu ₂ -si udu GUKKAL-še ₃ v.s. ṇen-na		10	12
‘... to count sheep’	lu ₂ udu šid-de ₃ im-ši-ṇen-na-me			12
‘... to the fat-tailed sheep’	udu GUKKAL-še ₃ ṇen-na v.s.	06	09	11 ² / ²⁶ , 12/ ¹²

Table 6.10. Sheep-plucking in messenger texts from Girsu. For references see Notizia 2009, 147–149.

Wool was sorted according to various grades of quality. The large Ur accounts (Table 6.9), for example, enumerate a total of ten different grades, including ‘black wool’.⁷⁷ Some documents prove that provisionally sorted wool was then, in a second process, more carefully assigned to various grades, and again the women active here are sometimes explicitly designated as ‘female weavers’.⁷⁸

The sorting of wool apparently was a normal task for the female weavers, so it is little wonder that relatively few documents explicitly mention this process. The treatment of the wool required skill and experience and a perfect organization of the workforce. In my opinion this is – besides the control of the herds – the main factor relevant to the quality of the wool from lowland Mesopotamia: the long tradition of organizing the urban workforce and the acquired experience and skills led to a perfect handling of the raw material plucked from the sheep.

*

The documentation demonstrates that in the second half of the 3rd millennium urban inhabitants of Mesopotamia sold wool even to those who imported gold or bitumen, thus coming from the mountainous regions. Despite the delivery of sheep to Sumer, neither mountain dwellers nor pastoralists in the steppe nor Mardu bartered their wool on the markets against grain – at least in the sectors of the economy that are reflected in the preserved documents.

Thus, for the 3rd millennium, it is a false assumption that pastoralists,

specialized in animal husbandry and independent of the urban organizations, played a major role in the import of wool. The evidence from Nabada/Tell Beydar, discussed in Section 3, leaves no place for nomads in that region, which differs substantially from the later Middle Bronze Age situation. Even at the end of the 3rd millennium, the presence of Mardu, Amorites, who may have been of nomadic background, and exchange with the eastern regions did not lead to an import of wool.

Secondly, one may implicitly have assumed that wool was a raw material to be transformed into high-quality textiles in the workshops of the cities. The evidence presented with some examples above demonstrates that wool was a *product*, and not just a raw material, whose quality depended on a careful control of the animal herds and breeding and on the input of a skilled and organized workforce to sort the wool. These two aspects are amply attested in the 3rd millennium archival documents, since the organization of the workforce is one of the main characteristics of the Early Bronze Age city-states and their successors, the provinces in the empires of Akkad and Ur. This system did not stop completely at the end of the 3rd millennium: the state still controlled herds of sheep in the Old Babylonian period, and the wool obtained was sold by merchants – just as in the preceding 3rd millennium.⁷⁹

The texts do not permit an exact identification of the types of sheep and their wool, except for the very general designation of ‘fat-tailed’ and ‘Sumerian’ sheep. But one may suppose a high quality of the wool at that time, if one considers successful breeding strategies in the well-guarded and assorted sheep herds and the organization of the work necessary to pluck and sort wool. In this way, wool became an export product of lowland Mesopotamia that may have substantially contributed to its economic wealth in the Early Bronze Age.

Abbreviations

References to textual sources correspond to the abbreviations given by the *Reallexikon für Assyriologie und Vorderasiatische Archäologie*.

ASamar-Suena

ISibbi-Suen

LeSuen 1982

Š Šulgi

ŠŠu-Suen

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Bibliography

- Adams, R. McC. (2006) Shepherds at Umma in the Third Dynasty of Ur: Interlocutors with a World Beyond the Scribal Field of Ordered Vision. *JESHO* 49, 133–169.
- Biga, M. G. (2010) Textiles in the Administrative Texts of the Royal Archives of Ebla (Syria, 24th century BC) with Particular Emphasis on Coloured Textiles. In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 146–172. Ancient Textiles Series 8. Oxford.
- Borger, R. (2003) *Mesopotamisches Zeichenlexikon*. Alter Orient und Altes Testament 305. Münster.
- Brunke, H. and Sallaberger, W. (2010) Aromata für Duftöl. In A. Kleinerman and J. Sasson (eds), *Why Should Someone who Knows Something Conceal It? Cuneiform Studies in Honor of David I. Owen on his 70th Birthday*, 41–74. Bethesda, Md.
- Charpin, D. (1982) Marchands du palais et marchands du temple à la fin de la 1ère dynastie de

- Babylone. *Journal asiatique* 270, 25–65.
- Deimel, A. (1926a) Die Viehzucht der Šumerer zur Zeit Urukagina's. *Orientalia* [Series Prior] 20, 1–61.
- Deimel, A. (1926b) Produkte der Viehzucht und ihre Weiterverarbeitung (Produkte der Molkerei; Schlachtfleisch; Schweinefett; Wolle; Weberei; Leder). *Orientalia* [Series Prior] 21, 1–39
- Deimel, A. (1931) *Šumerische Tempelwirtschaft zur Zeit Urukaginas und seiner Vorgänger. Abschluß der Einzelstudien und Zusammenfassung der Hauptresultate*. Analecta Orientalia 2. Roma
- Foxvog, D. A. (1994) A New Lagaš Text Bearing on Uruinimkina's Reforms. *Journal of Cuneiform Studies* 46, 11–15
- Garfinkle, S. (2012) *Entrepreneurs and Enterprise in Early Mesopotamia. A Study of Three Archives from the Third Dynasty of Ur*. CUSAS 22. Bethesda, Md.
- Heimpel, W. (1993) Zu den Bezeichnungen von Schafen und Ziegen in den Drehem- und Ummatexten. *Bulletin on Sumerian Agriculture* 7, 115–160
- Ismail, F., Sallaberger, W., Talon, P. and Van Lerberghe, K. (1996) *Administrative Documents from Tell Beydar (Seasons 1993–1995)*. Subartu 2. Turnhout
- Jacobsen, Th. (1970) *Toward the Image of Tammuz and Other Essays on Mesopotamian History and Culture*. Ed. by W. L. Moran. Cambridge, Mass.
- Lebeau, M. (2004) Le contexte archéologique et stratigraphique des documents épigraphiques découverts entre 1996 et 2002. In L. Milano et al., *Third Millennium Cuneiform Texts from Tell Beydar (Seasons 1996–2002)*. Subartu 12. Turnhout. 1–11.
- Lyonnet, B. (2004) Le nomadisme et l'archéologie: problèmes d'identification. Le cas de la partie occidentale de la Djéziré aux 3ème et début du 2ème millénaires avant notre ère. In C. Nicolle (ed.), *Nomades et sédentaires dans le Proche-Orient ancien. Compte rendu de la XLVIe Rencontre Assyriologique Internationale (Paris, 10–13 juillet 2000)*, 25–50. Amurru 3. Paris.
- Maeda, T. (1992) The Defense Zone during the Rule of the Ur III Dynasty. *Acta Sumerologica* 14, 135–172
- Maekawa, K. (1987) Collective Labour Service in Girsu-Lagash: the Pre-Sargonic and Ur III Periods. In M. A. Powell (ed.), *Labor in the Ancient Near East*. American Oriental Series 68. New Haven, 49–71.
- Marti, L. (2008) *Nomades et sédentaires à Mari: la perception de la taxe-sugûgûtum*. Florilegium marianum 10. Paris.
- Michalowski, P. (2011) *The Correspondence of the Kings of Ur. An Epistolary History of an Ancient Mesopotamian Kingdom*. Mesopotamian Civilizations 15. Winona Lake, IN.
- Michel, C. and Nosch, M.-L. (eds), (2010) *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*. Ancient Textiles Series 8. Oxford.
- Michel, C. and Veenhof, K. (2010) The Textiles Traded by the Assyrians in Anatolia (19th-18th Centuries BC). In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*. Ancient Textiles Series 8. Oxford, 210–271.
- Milano, L., Sallaberger, W., Talon, Ph. and K. Van Lerberghe (2004) *Third Millennium Cuneiform Texts from Tell Beydar (Seasons 1996–2002)*. Subartu 12. Turnhout.
- Notizia, P. (2009) *I testi dei messaggeri da Girsu-Lagaš della Terza Dinastia di Ur*. Nisaba 22. Messina.
- Ouyang, X. (2013) *Monetary Role of Silver and its Administration in Mesopotamia During the Ur III Period (c. 2112–2004 BCE): A Case Study of the Umma Province*. BPOA 11. Madrid.
- Pomponio, F. (2010) New Texts Regarding the Neo-Sumerian Textiles. In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*. Ancient Textiles Series 8. Oxford, 186–200.
- Porter, A. (2012) *Mobile Pastoralism and the Formations of Near Eastern Civilizations*. Cambridge.
- Powell, M. A. (ed.) (1987) *Labor in the Ancient Near East*. American Oriental Series 68. New Haven.
- Prentice, R. (2010) *The Exchange of Goods and Services in Pre-Sargonic Lagash*. Alter Orient und Altes Testament 368. Münster.
- Pruß, A. and Link, Ch. (1994) Zoomorphe Terrakotten. In J.-W. Meyer and A. Pruß, *Ausgrabungen in Halawa 2: Die Kleinfunde von Tell Halawa A*, 111–155. Schriften zur Vorderasiatischen Archäologie 6. Saarbrücken.
- Pruß, A. and Sallaberger, W. (2003/04) Tierhaltung in Nabada/Tell Beydar und die Bilderwelt

- der Terrakotten als Spiegel von Wirtschaft und Umwelt, *Archiv für Orientforschung* 50, 293–307.
- Sallaberger, W. (2004) A Note on the Sheep and Goat Flocks. Introduction to Texts 151–167. In L. Milano, W. Sallaberger, Ph. Talon and K. Van Lerberghe (eds), *Third Millennium Cuneiform Texts from Tell Beydar (Seasons 1996–2002)*, 13–21. Subartu 12. Turnhout.
- Sallaberger, W. (2005) The Sumerian Verb na de₅(-g) ‘to clear’. In Y. Sefati et al. (eds), “An Experienced Scribe Who Neglects Nothing”. *Ancient Near Eastern Studies in Honor of Jacob Klein*, 229–253. Bethesda Md.
- Sallaberger, W. (2007) From Urban Culture to Nomadism. A History of Upper Mesopotamia in the Late Third Millennium. In C. Kuzucuoğlu and C. Marro (eds), *Sociétés humaines et changement climatique à la fin du troisième millénaire: Une crise a-t-elle eu lieu en Haute Mésopotamie? Actes du Colloque de Lyon, 5–8 décembre 2005*, 417–456. Varia Anatolica 19. Paris.
- Sallaberger, W. (2013) The Management of the Royal Treasure: Palace Archives and Palatial Economy in the Ancient Near East. In J. A. Hill et al. (eds), *Cosmos and Politics in the Ideology of Kingship in Ancient Egypt and Mesopotamia*. 000–000. Philadelphia.
- Sallaberger, W. and Pruß, A. (in print) Home and Work in Early Bronze Age Mesopotamia: ‘Ration Lists’ and ‘Private Houses’ at Tell Beydar/Nabada. In P. Steinkeller (ed.), *Labor in the Ancient Old World*.
- Schmidt, C. (2012) *Die Keramik der Früh-Gazira V- bis Alt-Gazira II-Zeit*. Studien zur Urbanisierung Nordmesopotamiens A, 4. Wiesbaden.
- Schrakamp, I. (in print) Geographical Horizons of the Presargonic and Sargonic Periods. In W. Sallaberger and I. Schrakamp (eds) *ARCANE. Associated Regional Chronologies for the Ancient Near East and the Eastern Mediterranean 3: History and Philology*. Turnhout.
- Selz, G. (2010) “He put in order the accounts ...” Remarks on the Early Dynastic Background of the Administrative Reorganizations in the Ur III State. In L. Kogan et al. (eds), *City Administration in the Ancient Near East*. Proceedings of the 53e Rencontre Assyriologique Internationale Vol. 2, 5–30. Babel und Bibel 5. Eisenbrauns.
- Snell, D. C. (1982) *Ledgers and Prices. Early Mesopotamian Merchant Accounts*. Yale Near Eastern Researches 8. New Haven.
- Steinkeller, P. (1987) The Administrative and Economic Organization of the Ur III State: The Core and the Periphery. In McG. Gibson and R. D. Biggs (eds), *The Organization of Power: Aspects of Bureaucracy in the Ancient Near East*, 19–42. SAOC 46. Chicago.
- Steinkeller, P. (1995) Sheep and Goat Terminology in Ur III Sources from Drehem. *Bulletin on Sumerian Agriculture* 8, 49–70.
- Stępień, M. (1996a) *Animal Husbandry in the Ancient Near East. A Prosopographic Study of Third-Millennium Umma*. Bethesda, Md.
- Stępień, M. (1996b) The Organisation of Animal Pasturing in the Light of Balanced Accounts, Inventories of Sheep and Goat Herdsmen from Umma. In Ö. Tunca and D. Deheselle (eds), *Tablettes et images aux pays de Sumer et d’Akkad. Mélanges offerts à Monsieur H. Limet*, 161–177. Liège.
- Stol, M. (2004) Wirtschaft und Gesellschaft in altbabylonischer Zeit. In P. Attinger et al. (eds), *Annäherungen 4: Mesopotamien. Die altbabylonische Zeit*, 641–975. Orbis Biblicus et Orientalis 160/4. Fribourg und Göttingen.
- Stol, M. (2012) Bitumen in Ancient Mesopotamia. The Textual Evidence. *Bibliotheca Orientalis* 69, 48–60.
- Streck, M. P. (2002) Zwischen Weide, Dorf und Stadt: Sozio-ökonomische Strukturen des Nomadismus am Mittleren Euphrat. *Baghdader Mitteilungen* 33, 155–209.
- Van Lerberghe, K. (1996) The Livestock. In F. Ismail, W. Sallaberger, P. Talon and K. Van Lerberghe (eds), *Administrative Documents from Tell Beydar (Seasons 1993–1995)* 107–117. Subartu 2. Turnhout.
- Volk, K. (1999) Imkereien im alten Mesopotamien? In H. Klengel and J. Renger (eds), *Landwirtschaft im Alten Orient. Ausgewählte Vorträge der XLII. Rencontre Assyriologique Internationale. Berlin 4.-8.7.1994*, 279–290. Berliner Beiträge zum Vorderen Orient 18. Berlin.
- Waetzoldt, H. (1972) *Untersuchungen zur neusumerischen Textilindustrie*. Roma.
- Waetzoldt, H. (2010a) The Colours and Variety of Fabrics from Mesopotamia during the Ur III Period (2050 BC). In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 201–209. Ancient Textiles Series

8. Oxford.

- Waetzoldt, H. (2010b) Die Bedeutung von *igi-saṇ/saṇ₅/saḡ₉/saḡ₁₀*. In A. Kleinerman and J. Sasson (eds), *Why Should Someone Who knows Something Conceal It? Cuneiform studies in Honor of David I. Owen on his 70th birthday*, 245–255. Bethesda, Md.
- Wilcke, C. (2008) Der Kauf von Gütern durch den ‘staatlichen’ Haushalt der Provinz Umma zur Zeit der III. Dynastie von Ur: Ein Beitrag zu ‘Markt und Arbeit im Alten Orient am Ende des 3. Jahrtausends vor Christus’. In P. Michalowski (ed.), *On the Third Dynasty of Ur. Studies in Honor of Marcel Sigrist*, 261–286. JCS Suppl. Series 1. Boston.
- Wu, Y. (2006) Sheep, Goats, Pigs, Calves and Ducks in the House of the Lady in Girsu (2400 BC). *Journal of Ancient Civilizations* 21, 1–27.

1 This article owes central insights to Antoinette Rast-Eicher and Eva Andersson Strand at the ESF Explanatory Workshop in Nanterre, who have pointed out to me the importance of control in breeding and the work necessary to obtain wool for spinning. Furthermore, the discussions and presentations at the workshop have led to a better understanding of the preparation of wool and a complete revision of my original paper. I heartily thank Cécile Michel for her comments and Christian Hess for revising the English.

2 See e.g. Streck 2002; Marti 2008; Michel this volume. Porter 2013, chapter 1 argues convincingly for an integrative view on the various shades of lifestyles and economies.

3 Steinkeller 1987; Maeda 1992 on *gun₂ ma-da*.

4 Sallaberger 2007, 447; Michalowski 2011, 100–104; both with further literature.

5 On barley used to buy copper in Umma merchant accounts see Ouyang 2013, 120, footnote 383.

6 Michel and Veenhof 2010 with earlier literature, also discussing the import of textiles to Aššur from Babylonia.

7 A recent summary of the goods of the Ur III merchants accounts is Ouyang 2013; she does not, however, discuss the provenance of the various goods. For the case of resins which were both imported and farmed locally, see Brunke and Sallaberger 2010.

8 Sallaberger 2007.

9 Only two examples are cited here: Maekawa 1987, Selz 2010.

10 *Nik* 1 300 (Lugalanda 3): 42.5 minas (c. 22 kg) of wool worth 21.25 shekels to buy spices (*šem bulug₂*).

11 *DP* 518 (Lugalanda 6): 5 minas of wool together with 5 minas of silver for the seafaring merchant (*gaeš₃ga*) *Qiriribatuš*.

12 Foster, *ASJ* 19, 61 YBC 12130 (Lugalanda 6): 10 minas of silver and 300 minas of wool. It is no coincidence that the three Presargonic *Lagaš* references date to the time of Lugalanda, since under his successor, Urukagina, foreign commercial relations soon came to an end; see Schrakamp (in print).

13 (1) *Nik* 1 310 iii 8: 50 *ma-na siki še* ‘50 minas of wool (for) grain’ handed over to an Elamite in the context of a long list of grain given to Elamites (Prentice 2010, 107, footnote 434 erroneously calls *siki še* a type of wool; there is probably a confusion with *siki udu še gu₇-a*). (2) *Nik* 1 85 (Lug 1): (i) 4,30.0.0* *še gur-saṇ-ṇal₂/niṇ₂-sam₂ siki-kam/ur-e₂-muš₃/gal dam-gara₃ ensi₂-ka-ke₄* (ii) *en-u₄-da-na / dam-gara₃ e₂-munus-ra / e-na-šum₂ / elam^{ki}-še₃* (iii) *ba-de₆* ‘270 standard kor, barter for wool: Uremuš, the chief merchant of the city ruler gave it to Enudana, the merchant of the Emunus. It is brought to Elam’. Clearly the barley is given to the merchant of the Emunus to be brought to Elam, as in other documents; the additional note that it is ‘barter for wool’ indicates that the chief merchant Uremuš had exchanged the grain for wool. Prentice (2010, 107 with footnote 433), however, suggests an ‘(intended) importation of wool’; this would remain a unique reference to the import of wool.

14 Prentice 2010, 111–112.

15 Prentice 2010 interprets *ki-siki* as ‘weaving’ and *ki-gu* as ‘spinning’; however, the number of persons employed speaks against this interpretation, since spinning needs 10 times more work than weaving, but the number of persons employed at *ki-gu* is much lower. Therefore the traditional interpretation of women working with wool (*ki-siki*) or flax for linen (*ki-gu*) is maintained.

16 Prentice 2010, 112.

17 Prentice 2010, 110–111.

18 Wilcke 2008, 267–281.

19 Ouyang 2013, 146–147.

20 Stol 2012, 57–58.

21 Most recently Ouyang 2013, 117–123 and 233–247 with Tablets 5.2.A to 5.2.G.

22 AS 6/11, Nisaba 6, 2.

23 AS 7/07, *Ledgers* no. 10; AS 7/09, *Ledgers* no.10.

- 24 'Honey' (lal₃) appears in the merchants' accounts and so it may well have been imported to Sumer, since the honeybee was not native to lowland Mesopotamia (Volk 1999). The interpretation of lal₃ as 'date syrup' is problematic as long as its production is not attested in the enormous economic documentation of the Ur III period.
- 25 Ouyang 2013, 121.
- 26 Stol 2004, 922–926.
- 27 Garfinkle 2012, 36–71 with earlier literature.
- 28 On the economy of Nabada see now Sallaberger and Pruß in print.
- 29 Subartu 2, no. 118; Subartu 12, no. 151–167; see Sallaberger 2004; Pruß and Sallaberger 2003/2004. The goat herds equally present at Nabada (and likewise tabulated in Sallaberger 2004) are not discussed here.
- 30 On the find-spots of the herd inspection texts Subartu 12, 151–167, see Lebeau 2004, 1. 5 pl. I. 8, fig. 1–2.
- 31 The formula siki bar aš 3 sikil remained unclear to Van Lerberghe 1996, 109, and was not discussed by Sallaberger 2004; siki bar aš = 'single, one complete fleece', sikil 'free'; so these numbers indicate the number of sheep that did not deliver wool, probably because they had already lost their fleece before plucking. No more than 4 fleeces were usually lost from a standard herd of 210 sheep (Sallaberger 2004, 19–20). This seems to be a very low rate of losses and confirms the strict control of the flocks of sheep. The interpretation of the wool weight is confirmed by Subartu 2, no. 6, which says that 'one complete fleece' (siki bar aš) has the 'weight (ki-la₂) of 2', i.e. minas (c. 1 kg), as already noticed by Van Lerberghe 1996, 112.
- 32 Pruß and Sallaberger 2003/2004.
- 33 See Pruß and Sallaberger 2003/2004, 298–299. With a standard value of 2 to 3 hectares of land used per sheep, our 7,400 animals of small cattle would use 148 to 222 km². This corresponds to half of the estimated size of the province of Nabada. Additional space has probably to be calculated for the royal herds of Nagar.
- 34 See the references to the archaeological data in Lyonnet 2004.
- 35 See Sallaberger 2004, 14–17, especially on documents Subartu 2, nos 4 and 70, lists of hides (kuš) of sheep and of goats delivered by herdsmen.
- 36 Sallaberger 2013.
- 37 Subartu 2, no. 6. See Van Lerberghe 1996, 112.
- 38 DP 121. The pertinent texts on sheep were collected by Deimel 1926a, 24–48; see his summary Deimel 1931, 95; Wu 2006, 1–4, lists these texts without referring to earlier studies and without any discussion.
- 39 The respective term is na de₅-g; see Sallaberger 2005.
- 40 Foxvog 1994 with earlier literature.
- 41 Despite many studies on the subject (see e.g. the literature cited by Foxvog 1994), the wool business in the Emunus organization and the exact interpretation of the pertinent passages from 'Urukagina's Reforms' would be worth a new investigation. The differentiation of commodities according to their control by the palace, the seat of the political ruler, or by other organizations is a topic studied by Sallaberger 2013, discussing, however, only textiles, not wool for the Early Bronze Age.
- 42 Heimpel 1993, Steinkeller 1995
- 43 Stepień 1996a
- 44 Waetzoldt 1972
- 45 Jacobsen (1970, 423 footnote 10 [reprint of 1953 article]) proposed the reading uli-gi for eme-gi, followed e.g. by Waetzoldt 1972, 6, based on Nabnitu XXIII 231 (MSL 16, 218) eme⁶-li⁶gi = [...]. Whether /uli/ applies to EME or to EME.GI, it is a unique reading, not repeated e.g. in the Ea group and other lexical lists (see MesZL, Borger 2003, 58 = sub no. 61), where the only reading for EME is /eme/. The Akkadian entry is not preserved, but according to the context it should be a word including the sequence š-r, so eme-gi = Šumerum is possible. Should the reading /uli/ refer to ulu₃ 'South (wind)'?
- 46 The reading of the word written with the sign GUKKAL, Akkadian *k/gukkallu*, remains unknown in Ur III Sumerian, since the word ends in -n; the etymology kun₂-gal 'big tail' thus does not apply for the Ur III word. In German this sheep type is called *Fettsteiſſschaf* (oral information kindly provided by Joris Peters).
- 47 Heimpel 1993, 137–138 and 152, tables 15–16; Stepień 1996a, 51; *ibid.* 1996b, 172–175.
- 48 Waetzoldt 2010a, 201–202.
- 49 Waetzoldt 1972, 4–6; for the identity of the two designations at Umma see Heimpel 1993, 137–138.
- 50 Pomponio 2010, 194–195 gives the following prices: siki eme-gi: 4.75, 4.98, 6.66, 7.5 shekels/talent, siki kur-ra: 6, 7, 7.5, 9, 9.97 shekels/talent.
- 51 Stepień 1996b, 172 points to the fact that the last group of sheep headed by Seskala under the

foreman Urnungal does not belong to a temple. BPOA 6, 1274 (Umma, ŠS 2) notes mountain (sheep) wool (siki kur-ra) from Seskala collected by Urnungal from the 'sheep of Urlisina', probably referring to the former governor (ensi₂) of Umma. Seskala and Urnungal appear together also e.g. in Nisaba 11, 6 ii-iii ([ŠS 7?]), see the comments by al-Rawi and Verderame ad v. i 18): Seskala, the 'shepherd' (sipa), delivers wool from fat-tailed and [black?] sheep (iii 15–17), which are then said to be 'at Urnungal, the "accountant"' (ki ur-ⁿnun-gal bešen-dub-ba); so the 'foremen' of YOS 4, 237 are those collecting the wool from their shepherds, who care for flocks under various temples. For other documents on the role of the temples in the organization of animal husbandry at Umma see Stępień 1996a, 40–63.

52 This view of the Ur III state as a supra-structure on existing political, social and economic organizations is gaining ever greater acceptance. The mass of administrative documents from the Ur III period formerly led to the impression of a dominant state that introduced the general management of the land's resources; this view led to various problems also in understanding animal husbandry, as exemplified by Adams 2006. Adams implicitly assumes that the Ur III administration was always and only state administration, and that this was built up from scratch; so he speaks of 'shepherd-agents as the interface between the elite and pastoral sectors' (*ibid.* 149), and for example formulates that 'we have no information or [sic] how shepherds were recruited'. The document YOS 4, 237, describing the control of the governor's herds by the temples, well explains the organization of animal husbandry. Thus there is not such a large gap between a managerial 'elite' and 'pastoralists', as Adams assumed; the so-called 'pastoralists' are the herdsmen listed as caring for the sheep of the various temples.

53 UET 3, 1504, IS 2, and 1505, IS 1.

54 8,024 talents = 240,720 kg of wool plucked; with 0.75 kg/sheep, this amounts to 320,960 sheep.

55 UET 3, 1505; in 1504 even more.

56 Also UET 3, 1538:2, § 46.

57 UET 3, 1537, § 46.

58 For royal herds at Girsu see *MTBM* 257.

59 'Periphery' as used by Steinkeller 1987, corresponding to the 'defense zone' of Maeda 1992.

60 Sallaberger 2007, 447; Michalowski 2011, 100–104. Other recent summaries on the Mardu include Verderame 2010 and Porter 2012.

61 The translation is the one given by Sallaberger 2007, 444–445, who argues explicitly in the spirit of Verderame 2010, 252–253, namely that the term does not represent an objective description, but a perception by the urban culture. The stereotypes that Mardu know no grain and no cities, and thus live in the steppe on animal herding, are conveniently summarized by Porter 2012, 290. This semantic approach was not accepted by Michalowski 2011, 82–121, who instead referred to various facets of the Mardu ('Amurru') in the textual record.

62 Sallaberger 2007, 444–450 for a synthesis of textual and archaeological evidence; Verderame 2010 and Michalowski 2011, 82–121 concentrate on the Mesopotamian textual sources.

63 Latest description by Schmidt 2013, 105–112, who presents a new ceramic chronology based on the Tell Mozan stratigraphy; level C7 there dates to the Ur III period, contemporary levels are found only in Chagar Bazar, Tell Barri, Tell Arbid and Tell al-Rimah, furthermore in other sites in Western Syria, the Middle Euphrates region and Mesopotamia. This distribution agrees with the mapping of the political centres of the Ur III period by Sallaberger 2007, 433–441.

64 Sallaberger 2007, 448, based on a count of respective documents (38 deliveries by Mardu, but only 34 by all other persons, whereby Mardu appear only rarely in the records); cf. Michalowski 2011, 89. Although fat-tailed sheep were also controlled by the Sumerian organizations (see section 4 above), the high proportion of this breed in Puzriš-Dagan is noteworthy, since the royal administration primarily deals with meat for consumption. In this context, inhabitants of Babylonia usually did not deliver fat-tailed sheep.

65 This is based on a search in BDTNS (<http://bdtns.filol.csic.es/>) on the combination of 'siki' and 'mar-tu' in the same documents (January 2013 and July 2013) and on a review of relevant literature on animal husbandry in the Ur III period (see some references below). It is possible, however, that I may have overlooked some traces of wool sold or bartered by Mardu or other independent groups to Mesopotamia.

66 Michalowski 2011, 107–109 speaks of a 'military' function exercised by Mardu ('Amurru') in Sumer. He underlines the fact that some Mardu served as guards or in the military, 'but there are other occasions in other times [and also in the same period – W. S.] when the term referred to an area, ethnic groups, as well as to a language, and while ultimately these meanings are all related, they are not the subject of the present investigation' (*ibid.* 109–110). The service of the Mardu in (para)military functions agrees well with their general designation as 'nomads' v.s., for which see the comparative examples provided by Michalowski 2011, 108.

67 Notizia 2009, 109–184 gives a very useful catalogue of the reasons for travels in the Ur III messenger

texts from Girsu. However, before using these tablets one should be aware of the fact that Notizia only notes Mardu, but no other designations or professions in the commentary column ('altro').

⁶⁸ As already acknowledged in footnote 1, Antoinette Rast-Eicher and Eva Andersson Strand (see also her paper in this volume) made me aware of the importance of these two aspects.

⁶⁹ Note, e.g., the studies of Heimpel 1993, Steinkeller 1995, Stępień 1996a, or Sallaberger 2004.

⁷⁰ Steinkeller 1995.

⁷¹ The control of sheep is conveniently tabulated by Notizia 2009, 146–149.

⁷² Notizia 2009, 157–159.

⁷³ Waetzoldt 1972, 14–15.

⁷⁴ *TUT* 164¹⁹, AS 5/11.

⁷⁵ UET 3, 1504 and 1505.

⁷⁶ *DAS* 255, ŠS 1/02.

⁷⁷ Tabulated by Waetzoldt 1972, 66.

⁷⁸ Waetzoldt 1972, 40–44 and Waetzoldt 2010b, 247–249.

⁷⁹ Stol 2004, 922–926, summarizing the work of Charpin 1982 on the sale of wool at Sippar to the merchants (also De Graef in this volume), and *ibid.* 972 on evidence for the sale of wool from Babylonia, including exports to Mari. But the purchase of wool at Emar points to import of wool as well. See also Michel in this volume.

7. Wool in the Economy of Sargonic Mesopotamia

Benjamin R. Foster

*WOOL IS BEST
ARCHEOLOGISTS DIG IT*

sign on a Philadelphia textile mill

The Akkadian, or Sargonic, period is defined today principally by the reigns of five kings of the Sargonic dynasty spanning about 130 years in the 23rd and 22nd centuries BC. The rich source material for this crucial phase of Mesopotamian history gives the impression of remarkable innovation. The unification of Mesopotamia and repeated invasions of southwestern Iran, the Gulf, northern Syria and southern Anatolia expanded forever the Mesopotamian idea of what was militarily and politically possible. This brought with it spectacular developments in royal ideology and self-presentation that fascinate even today with their boldness, impact, and success. The Akkadian period saw significant social and economic developments as well, such as creation of a class of people dependent upon the royal household for their livelihood and of a large standing army. An influx of foreign goods into Mesopotamia generated extraordinary wealth and provoked a taste for luxury and display among the notables and beneficiaries of the new order. Aggressive expansion of the royal domains through confiscation and purchase opened new opportunities for development of arable land in the countryside for the ruling elite and for those they patronized. Industrialization and mass production changed crafts into industries, even as artisans found new markets for their skills in grandiose royal projects and in the demand for luxury objects, such as jewelry, fine furniture, and fashionable clothing.¹

Since wool had for centuries been a staple of the Sumerian economy and one of Sumer's most important export commodities, wool production must also have been important, perhaps crucial, in the Akkadian economy, although administrative records for it are sparse compared to those of later periods.²

Sumerian debate literature, which sometimes offered penetrating analyses of the fundamental elements of Sumerian culture, tended to stress their usefulness to the human race rather than their economic importance.³ Thus a debate between sheep and grain proclaims them the divinely ordained twin pillars of Sumerian society. The human race began its advance from barbarism to civilization, the composition says, when people learned agriculture and animal husbandry. The specific uses of wool that the ancient author points out are to make threads that hold both

beautiful things and everyday tools together, an *inclusio* for the importance of wool as an all-purpose fibre. Thus wool makes fine clothing, weapons and body armor, and bags to hold provisions. Although the boastful sheep's inventory of virtues is centered on the king and his needs, as befits a masque performed, evidently, at a royal banquet, she makes no mention of her wool as a source of wealth, a topic of greater importance than the king's paraphernalia for understanding its economic importance.⁴

Wool was a means for an enterprising person to accumulate a financial competency. Although some scholars of the economy of ancient Mesopotamia believe that the 'state', meaning the royal household and its dependents, included nearly all the settled population of its dominion in a redistributive economy, thus excluding opportunities for a significant 'private sector', documentation from the Akkadian period shows the opposite.⁵ There was no large, rationed workforce outside of the military, nor did the royal household have either the capacity or the economic goal of including even a significant proportion of the population within its patronage network. Akkadian power was sustained by a privileged ruling elite, backed up by a strong army. Membership in the elite was open to anyone willing to enter royal service, a choice that might or might not entail forsaking birthplace and community ties.⁶ This type of social mobility was a distinctive feature of Akkadian society. Individual accumulation of wealth was characteristic of the ruling class but was in principle also possible for anyone with access to herds, arable land, or other means of production.

Studies of nomads in modern Iraq and Iran have shown that successful sheepherders can prosper more rapidly than farmers, to the extent that the most enterprising of them retire from herding comparatively young, buy a house in a town or village, and live comfortably, engaging others to herd their animals for them.⁷ This is because the investment, labor, risks, losses, and expenditures for herding may be appreciably lower than for other economic endeavors in the same region, though this is difficult to quantify. Furthermore, wool was the most important basis for textile production, which, at both the household and industrial levels, could generate far more wealth and exchange power than the raw material alone.

In ancient times, as well as modern, wool was a versatile and renewable resource, so sheep were potentially more profitable than other domesticated animals. Pigs, for instance, yielded no product of value without being killed.⁸ The major value of donkeys and oxen was in their long-term labor capacity. Unlike renewable food products of animals, such as milk or cheese, wool was easy to store and transport and did not spoil. Therefore, under the right conditions, production of wool could be lucrative and low-risk, and there were no natural limits of scale. Large numbers of sheep were easier to manage than large numbers of most other kinds of livestock. There were practical limits to the size of a flock of sheep, but none to the number of flocks a single person could manage if he could find herdsman to do the work for him and if he understood his business.

The Akkadian period shows early instances of the herd master, a person accountable for large numbers of animals dispersed in various herds, for which individual herdsman were responsible.⁹ Here was a path to upward mobility in society, especially if ways could be found to provide herding services to wealthy people, such as Akkadian notables. A special advantage of wool was that it could

be readily converted to silver, the basic medium of exchange needed to participate in the local economy beyond the level of barter.¹⁰ Successful production and marketing of wool could therefore be a path to prosperity in ancient Sumer as well as it was in pre-modern south Persia.

The first consideration is to establish the value or buying power of wool. Even in a single fleece, the quality of wool will vary widely to the expert eye, suggesting a wide possible range in prices for wool. When large quantities of wool were accounted for, there is no way to know whether they had been sorted into grades or whether the price reflected a mixture of qualities, allowing for standard, estimated percentages of different grades in a typical lot. Since sorting wool was labor intensive and would have added a major transaction cost to a large quantity, the latter possibility seems more in accordance with Akkadian record-keeping practice, which tended to work with schematic figures.¹¹

A record from the Akkadian governor's palace at Adab accounts for 3000 plucked sheep, plus 3000 others, perhaps not yet plucked.¹² Taking an approximate figure of two minas (1 kg) of wool per animal in the first entry, this would yield perhaps 6000 minas of wool, about 3000 kilograms. In the early Akkadian period, an official price for wool was one quarter shekel of silver per mina (i.e. 15 shekels per talent), so, on the basis of this figure, the 6000 minas would be worth about 25 minas of silver, assuming a way could be found to convert it to such a large sum.¹³

This sum would have substantial buying power in the Akkadian period. It might buy 270 hectares of arable land in rural Akkad. It might buy 3100 square metres of urban living space, that is, a house roughly 55 metres on a side.¹⁴ For comparison, at Akkadian Ešnunna, a good-sized house in the choice neighborhood next to the Northern Palace covered 169 square metres, so 3100 square metres was palatial, larger than even the Northern Palace itself (2100 square metres).¹⁵ This silver would buy more than 100 choice slaves in a period only notables had slaves.¹⁶ It might buy 750 or more sheep to increase the herd.¹⁷ Therefore a resource like this opened major opportunity to its possessor.

For evidence that the state sector converted some of its income in kind into silver to expand its holdings in the countryside, one may again consider Ešnunna. There, records from the Northern Palace accounted for livestock in the amount of 2000 goats and over 1200 sheep,¹⁸ while a second group of records from that same palace suggests that the governor aggressively expanded the urban and rural land at his disposal by cash purchases from individual owners.¹⁹ The excavators of the palace noted how the building itself expanded in size from the early to the Classical Sargonic period.²⁰ The governor, who may well have been a member of the royal family, was more than a mere administrator of existing resources, but a householder who worked to build them up, and, no doubt, to reward himself and his dependents. While we cannot assert that wool production was a basis for this, rather than agriculture, it was no doubt a factor, as 1200 sheep would yield about 2400 minas, or 1200 kilograms, of wool annually, for a cash value of about 10 minas of silver.²¹ As mentioned below, goats may in fact have been more important than sheep in the Diyala region.

There were of course risks and losses in sheep herding, but, to judge from later evidence, these could be forecast using mathematical constants. At Old Babylonian Larsa, up to 15% of a herd was deemed a normal annual attrition. Any percentage

higher than that was deemed abnormal, so the herd master had to compensate for it himself.²² At Larsa, this meant that part of the risk was transferred to the agent rather than being entirely with the owner of the sheep, and this was presumably the case in the Akkadian period as well. The herd could be expected to replenish itself; in a given year, 80% of the ewes might produce a lamb. Assuming a low figure of a roughly equal ratio of males to females (normally ewes far outnumbered rams), the governor of Ešnunna could expect a yield of well over 450 lambs a year to make up for the anticipated regular loss of 270 sheep a year to natural causes. That is, he could expect his herd to gain about ten percent annually, rather better than many investment strategies in modern capitalist societies.²³

Another way to assess the profitability of wool in the Akkadian period is to compare it with earlier figures. A Dilmun merchant in the time of Lugalanda of Lagaš, a few generations before the Akkadian period, took 300 minas of wool from Lagaš to Dilmun. He used it to purchase 375 minas of copper, some at the rate of one mina of wool to one mina of copper (1:1), some at the rate of 1:1.5.²⁴ The Akkadian governor of Adab, with the wool at his disposal, could have bought at that price 6000 minas of the cheaper variety of copper, or about 3000 kilograms, more than the weight of the large hordes of copper implements found at various Akkadian sites combined.

Wool was 18% cheaper, in relation to silver, in the Akkadian period than in late Early Dynastic Lagaš. By the Ur III period (the end of the 3rd millennium), the price of wool dropped considerably, from one unit of silver to 240 units of wool (1:240) to 1:600, compared to 1:360 in the Old Babylonian period (the first half of the 2nd millennium). This suggests that during the Ur III period, production greatly increased or that the official price of wool was low.²⁵ The Kings of Ur owned gigantic herds, far larger than any figures known from the Akkadian period, so the buying power of their wool, even at low prices, was enormous.²⁶ However approximate all these figures may be, it seems clear that wool had important buying power in Akkadian Mesopotamia.

Large households have, of course, large expenses. Raw wool was a ration or entitlement item for the working dependents of great establishments, along with their families.²⁷ A wool distribution from the estate of Mesag, an Akkadian notable, in Sumer, includes about 93 people, among them soldiers, workmen, skilled workmen or men of special status, 21 women, 18 boys and at least nine girls. The adults received four or five minas each, the children less, for a grand total of 511 minas, or about 256 kg. Although this household was smaller in scale than the governors' households of Adab and Ešnunna, and these people may have represented about half the household staff, one is still entitled to guess that the herds maintained by Mesag's household were easily capable of producing the required amounts, with wool to spare. One herd count from this estate shows well over 1000 sheep in three herds, yielding perhaps 29 talents of wool (about 870 kg, figure for one herd lost), far more than required for the recorded wool distributions.²⁸

Taking a figure of four minas as typical for women and five minas as typical for men, one can estimate the needs of the governor's palace at Ešnunna. Applying these figures to a fairly comprehensive ration list of grain rations that went to at least 105 male and 585 female members of the great household, one finds that

2865 minas of wool would be needed to sustain a ration issue to this group, fairly close to the 2400 minas projected from the record of sheep mentioned above.²⁹ Economists might therefore consider this an 'autarkic' household, meaning that it could supply its own needs, but also implying (from the available herd figures) that it might not have substantial surplus buying power. In fact, the household probably had more than enough for its needs, if only because of the larger number of goats that has not been accounted for. A surplus could go towards the regular purchases of land and of slaves in the archive, as well as the luxury goods scattered throughout the palace even in its ruinous and eroded state. Hints of such a surplus are provided by arrears, or amount due, of wool from three men (herd masters?) in the amount of 1440 minas, half what was needed to ration the entire workforce.³⁰ Thus one finds household records in which its wool is converted into silver, and one land sale even specifies that the wool used for it has been weighed with the silver weight, although there was a standard wool weight in use at the time.³¹ Some argue that the large number of women compared to men in Northern Palace ration list suggests that weaving was an important industry there, although no archaeological evidence for weaving, such as loom weights, was found.³² However that may be, one record from the building is a receipt for sixty minas of wool to make textiles.³³ Textiles would add important value to wool and goat's hair, but Akkadian sources do not give a basis for saying how much.

Recalling that the record from the governor's household at Ešnunna contained more goats than sheep, one may suggest that it may have had far more animal fibres at its disposal than it needed. Ancient documents do not often distinguish between sheep's wool and goat's hair; therefore the figures given here are based on sheep alone. Taking a rough figure of 250 grams of hair per goat, 2000 goats would yield about 500 kg of goat's hair, a figure comparable to that of a text, also from Ešnunna, which lists 586.5 kg of goat's hair. Goats may have been an important source of fibre, even preferred, in Akkad, whereas sheep were perhaps preferred in Sumer.³⁴

Wool management at the level of the herd master and the individual household is less systematically documented. A collection of records from the Sumerian city of Umma documents the activity of a family of herd masters.³⁵ There is no way to know how many sheep they had in the various herds they kept records for. One records an arrears, or amount due, of 560 animals from one of the herd masters, so there may have been several thousand in all. To judge from a group of herd records, 43 animals was typical of a single flock, which seems small, because one shepherd in another record has an arrears of 201 sheep and 49 minas of wool. The sheep were plucked in the eighth month of the year and a count was made of them. The strict accountability of the Umma records shows that these herd masters were managing animals that did not belong to them, some belonging to a 'palace'. As it happens, few texts in this archive deal with wool, and only one with goat's hair. The wife of one of the herd masters bought and sold wool. One of her documents records the buying and selling of 61 minas of wool, a fairly small amount compared to the large herds belonging to the Akkadian governors, but still worth over fifteen shekels of silver. Small scale, perhaps, but more than enough to buy a first-class male slave or a small field.

A commercial account of wool shows that prices for wool varied widely, when sorted for quality.³⁶ It itemizes 36 minas (18 kg) of wool priced at 1:181 and 36

talents and 35.5 minas (1098 kg) priced at about 1:360, so the first, presumably choicer lot, was twice as valuable as the much larger one. The Akkadian merchants at Susa also had wool in their accounts.³⁷

The sequence of tasks (*chaîne opératoire*) between herd management and weaving is only partly documented.³⁸ Records were occasionally kept of dipping sheep prior to plucking, the plucking operation, delivery of wool and goat's hair to the palace, storage of wool, and its disbursement as rations or to make textiles and other goods.³⁹ Sorting and combing are not attested as such, spinning only in records of threads, and weaving mostly indirectly through mention of weavers and woven goods.⁴⁰ Various specifications of wool are found in the records, referring to quality, such as 'choice' and 'ordinary', and to wool that has been treated in specific ways, but for these matters the Ur III sources are much richer.⁴¹

Among lists of marriage gifts, one finds 10 minas of wool in a fairly substantial bride gift, so this may have been a good household stock; the wife of the herd master sold six times that amount in one transaction.⁴² On the other hand, wool was seldom included in the barge loads of goods sent from Mesag's estate as gifts or taxes to the crown, so perhaps it was not a high prestige item.⁴³ Rather, linen was the prestige cloth for the new fashions of clothing among the Akkadian elite.⁴⁴

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The boastful sheep in the Sumerian dialogue was right – wool was the wonder fibre of Sumero-Akkadian culture of the late 3rd millennium. But it was culturally undervalued, as she learned when grain was pronounced the winner of the debate. A piece of much later Akkadian literature sums this up succinctly:

If you're a good housewife, make a home,
If you're a ninny, work wool.⁴⁵

Abbreviations

BIN *Babylonian Inscriptions in the Collection of J. B. Nies*. New Haven.

CUSAS *Cornell University Studies in Assyriology*. Ithaca.

ITT *Inventaire des Tablettes de Telloh*. Paris.

MAD *Materials for the Assyrian Dictionary*. Chicago.

MDP *Mémoires de la Délégation en Perse*. Paris.

STTIV. Donbaz and B. Foster, *Sargonic Tablets from Telloh in the Istanbul Archaeological Museums, Occasional Publications of the Babylonian Fund* 5. Philadelphia.

Bibliography

- Adams, R. (2006) Shepherds at Umma in the Third Dynasty of Ur. *Journal of the Economic and Social History of the Orient* 49, 133–169.
- Alster, B. and Vanstiphout, H. L. J. (1987) Lahar and Ashnan: Presentation and Analysis of a Sumerian Debate Poem. *Acta Sumerologica* 9, 1–43.
- Barth, F. (1961) *Nomads of South Persia: The Basseri Tribe of the Khamesh Confederacy*. Oslo and London.
- Breniquet, C. (2008) *Essai sur le tissage en Mésopotamie, des premières communautés sédentaires au milieu du III^e millénaire avant J.-C.* Paris.
- Bridges, S. (1981) *The Mesag Archive: A Study of Sargonic Society and Economy*. Dissertation: Yale University.
- Charpin, D. (1982) Marchands du palais et marchands du temple à la fin de la dynastie de Babylone. *Journal Asiatique* 270, 25–65.
- Crawford, H. (1973) Mesopotamia's Invisible Exports in the Third Millennium BC. *World*

- Archaeology 5, 232–241.
- Delougaz, P., Hill, H. D. and Lloyd, S. (1967) *Private Houses and Graves in the Diyala Region*. Oriental Institute Publications 88. Chicago.
- Diakonoff, I. M. (1982) The Structure of Near Eastern Society before the Middle of the 2nd Millennium BC. *Oikumene* 1, 7–100.
- Edzard, D. (1968) *Sumerische Rechtstutkunden des III. Jahrtausends aus der Zeit vor der III. Dynastie von Ur*, Abhandlungen der Bayerischen Akademie der Wissenschaften, Philosophisch-historische Klasse, Neue Folge 67. Munich.
- Foster, B. (1982) *Umma in the Sargonic Period*. Hamden, Ct.
- Foster, B. (1983) Ebla and the Origins of Akkadian Accountability. *Bibliotheca Orientalis* 40, 298–305.
- Foster, B. (1986) Agriculture and Accountability in Ancient Mesopotamia. In H. Weiss (ed.), *The Origins of Cities in Dry-Farming Syria and Mesopotamia in the Third Millennium BC*, 109–28. Guilford, Ct.
- Foster, B. (1997) A Sumerian Merchant's Account of the Dilmun Trade. *Acta Sumerologica* 19, 53–62.
- Foster, B. (2000) The Forty-nine Sons of Agade. In S. Graziani (ed.), *Studi sul Vicino Oriente Antico dedicati alla memoria di Luigi Cagni*, 309–318. Istituto Universitario Orientale, Dipartimento di Studi Asiatici, *Series Minor* 61. Naples.
- Foster, B. and Salgues, E. (2006) "Everything except the squeal": Pigs in Early Mesopotamia. In B. Lion and C. Michel (eds), *De la domestication au tabou, le cas de suidés au Proche-Orient ancien*, 283–291. Paris.
- Gelb, I. J. (1965) The Ancient Mesopotamian Ration System. *Journal of Near Eastern Studies* 24, 230–243.
- Gelb, I. J. (1986) 'Ebla and Lagash'. In H. Weiss (ed.), *The Origins of Cities in Dry-Farming Syria and Mesopotamia in the Third Millennium BC*, 157–67. Guilford, Ct.
- Gelb, I. J., Steinkeller, P. and Whiting, R. M. (1991). *Earliest Land Tenure Systems in the Near East: Ancient Kudurrus*. Oriental Institute Publications 104. Chicago.
- Hallo, W. W. and Curtis, J. (1959) Money and Merchants in Ur III. *Hebrew Union College Annual* 30, 103–139.
- Kraus, F. R. (1966) *Staatliche Viehhaltung im altbabylonischen Lande Larsa*. Mededelingen der Koninklijke Nederlandse Akademie van Wetenschappen, A.F.D. Letterkunde, Nieuwe Reeks 29 no. 5. Amsterdam.
- Lambert, M. (1960) Le bain des brebis. *Revue d'Assyriologie* 54, 88.
- Lambert, W. G. (1975) The Problem of the Love Lyrics. In H. Goedicke and J. J. M. Roberts (eds), *Unity and Diversity. Essays on the History, Literature, and Religion of the Ancient Near East*, 98–135. Baltimore.
- Liverani, M. (1988) *Antico Oriente: Storia, Società, Economia*. Rome-Bari.
- Neumann, H. (2002) Der sogenannte Oikos-Ökonomie und das Problem der Privatwirtschaft im ausgehenden 3. Jahrtausend v. Chr. in Mesopotamien. In A. Hausleiter, S. Kerner, and B. Müller-Neuhof (eds), *Material Culture and Mental Spheres. Rezeption archäologischer Denkrichtungen in der Vorderasiatischen Altertumskunde. Internationales Symposium für Hans J. Nissen, Berlin, 23.-24. Juni 2000*, 273–284. Alter Orient und Altes Testament 293. Münster.
- Pomponio, F., Visicato, G. and Westenholz, A. (2006) *Le Tavolette cuneiformi di Adab delle collezione della Banca d'Italia*. Rome.
- Postgate, M. (1992) *Early Mesopotamia, Society and Economy at the Dawn of History*. London.
- Potts, D. T. (1997) *Mesopotamian Civilization. The Material Foundations*. Ithaca.
- Powell, M. (1987/90) Masse und Gewichte. In D. O. Edzard (ed), *Reallexikon der Assyriologie* 7, 457–530. Berlin.
- Powell, M. (1996) Money in Mesopotamia, *Journal of the Economic and Social History of Mesopotamia* 39, 224–242.
- Powell, M. (1999) *Wir müssen unsere Nische nutzen: Monies, Motives, and Methods in Babylonian Economics*. In J. G. Dercksen (ed.), *Trade and Finance in Ancient Mesopotamia, Proceedings of the First MOS Symposium (Leiden 1997)*, 5–23. MOS Studies 1. Leiden.
- Renger, J. (2002) Wirtschaftsgeschichte des alten Mesopotamien. Versuch einer Standortbestimmung. In A. Hausleiter, S. Kerner, and B. Müller-Neuhof (eds), *Material Culture and Mental Spheres. Rezeption archäologischer Denkrichtungen in der Vorderasiatischen*

- Altartumskunde. Internationales Symposium für Hans J. Nissen, Berlin, 23.–24. Juni 2000*, 239–265. Alter Orient und Altes Testament 293. Münster.
- Renger, J. (2007) Economy of Ancient Mesopotamia: A General Outline. In G. Leick (ed.), *The Babylonian World*, 187–917. London.
- Rowton, M. (1973) Autonomy and Nomadism in Western Asia. *Orientalia* NS 42, 247–258.
- Salgues, E. (2011) Naram-Sin's Conquests of Subartu and Armanum. In G. Barjamovic, J. Dahl, U. Koch, W. Sommerfeld and J. Westenholz (eds), *Akkade is King: A Collection of Papers by Friends and Colleagues Presented to Aage Westenholz on the Occasion of His 70th Birthday, 15th of May 2009*, 253–272. Leiden.
- Snell, D. C. (1982) *Ledgers and Prices, Early Mesopotamian Merchant Accounts*. Yale Near Eastern Researches 8. New Haven.
- Vanstiphout, H. L. J. (1990) The Mesopotamian Debate Poems: A General Presentation. *Acta Sumerologica* 12, 271–318; 14, 339–367.
- Waetzold, H. (1972) *Untersuchungen zur neusumerischen Textilindustrie*. Roma.
- Waetzoldt, H. and Velling, E. (2011) 'Spinnen'. *Reallexikon der Assyriologie* 13, 1–5.
- Westenholz, A. (1994) The Old Akkadian Period. History and Culture. In W. Sallaberger and A. Westenholz *Mesopotamien: Akkad-Zeit und Ur III-Zeit*, 17–117. Freiburg and Göttingen.
- Zhi, Y. (1989) *Sargonic Inscriptions from Adab*. Periodic Publications on Ancient Civilizations 1. Changchun, China.

1 For an authoritative survey of the Akkadian period, Westenholz 1999.

2 Crawford 1973; for wool in the economy of the 'northern tier' of Mesopotamia and Syria, Gelb 1986, 165.

3 Vanstiphout 1990.

4 Alster and Vanstiphout 1987.

5 Renger 2002; Renger 2007; Neumann 2002.

6 Diakonoff 1982, 66–67; Liverani 1988, 246–247; Foster 2000.

7 Barth 1961, 105–107 (with added prosperity if he leases out land, but diminished by polygyny and the necessity of providing patrimony to sons); Rowton 1973.

8 Foster and Salgues 2006.

9 Postgate 1992, 159–163; Adams 2006: 149 ('shepherd agents').

10 Hallo and Curtis 1959; Powell 1996; Powell 1999.

11 Foster 1983; Foster 1986.

12 CUSAS 19 74.

13 Gelb, Steinkeller and Whiting 1991, 1:289; Adams 2006, 152 suggests a somewhat lower 1.8 minas as a standard wool yield per animal, based on Ur III norms; a low figure of 225 shekels from 3 male sheep (75 per animal) is noted in an Akkadian-period Adab record (Zhi 1989, 195).

14 Prices of real estate summarized in Gelb, Steinkeller and Whiting 1991, 1:267–269, 271–273. Wool used to purchase land is attested in the lawsuit BIN 8 170 (= Edzard 1968, no. 88), according to which the buyers delayed payment so long that calculations had to be made for the shift in value of the original price in wool and grain in the intervening good years versus bad ones. The basis for such calculations could be records of adverse weather events, such as an exceptional frost recorded at Adab (Zhi 1989, 136–137).

15 Hill in Delougaz, Hill and Lloyd 1967, 171–9, plates 27–28. House 37, for example, was about 165 square metres; nearby House 36 was more than twice as large. Two houses immediately adjoining the early phase of the Northern Palace, D 14 and E 15, were smaller and absorbed into the expanding palace in the later Akkadian period (plate 36). Urban real estate was often considerably more expensive in Sumer. The governor of Adab, for example, paid 20 shekels of silver for about 35 square metres of what must have been choice urban space (Pomponio, Visicato and Westenholz 2006, 134 no. 65, two lines missing, however, perhaps a garden or open space was included).

16 Gelb, Steinkeller, and Whiting 1991, 1:275–278.

17 Snell 1982, 145–146 (Ur III).

18 MAD 1 27, 29.

19 MAD 1 45, 48, 50 (price in silver, wool, and oil), 51, 52, 58, 67, 74 (all from the Northern Palace courtyard). Square E in the Northern Palace yielded more: MAD 1 111, 119, 120, 128. Arable land in the immediate area normally went for one to three shekels of silver per 3600 square metres, plus a payment in grain. The low prices for arable land in the 3rd millennium present a problem that lies beyond the scope of this essay.

20 Lloyd in Delougaz, Hill and Lloyd 1967, 196–198.

- 21 For palace enterprise in wool in the early 2nd millennium, Charpin 1982.
- 22 Kraus 1966, 46–49.
- 23 Adams 2006, 152 suggests a 16% lamb yield as normative.
- 24 Foster 1997.
- 25 Snell 1986, 178–181; Foster 1997.
- 26 Potts 1997, 92–93 estimates 500,000 head for accountable herds in Ur III records; see also Sallaberger in this volume.
- 27 Gelb 1965, 235.
- 28 BIN 8 152; Salgues 2011, 262.
- 29 MAD 1 163.
- 30 MAD 1 301.
- 31 MAD 1 162; FM 36. The wool weight was standardized in the Akkadian period (Powell 1987/90, 508); an early Akkadian wool weight was found at Adab (Wilson 2012, 63, 73).
- 32 Breniquet 2008, 64–65.
- 33 MAD 1 157.
- 34 MAD 1 312; For a large amount of goat's hair in Sumer, STTI 147 (x + 32 talents).
- 35 For a general study of this family archive, Foster 1982, 52–78.
- 36 BIN 8 286.
- 37 MDP 14 16 + 46 + 55; see Foster 1993.
- 38 For this concept, Breniquet 2008, 269–303.
- 39 For sheep dipping, Foster 1982, 66; M. Lambert 1960; Storage: ITT V 9417; STTI 174; sealing, STTI 28; distribution as rations, ITT II 3100, STTI 123, 124, 164; disbursement to make textiles, STTI 16, 40; to make ropes, BIN 8 134. Wool was also collected from sheep that were issued for food and offerings and given as gifts, STTI 137.
- 40 Combed wool may be referred to in BIN 8 170 and ITT I 1364 (assuming that GIŠ.RE refers to combing). Thread production is little known: Waetzoldt and Velling 2011 note that, according to Ur III records, woollen thread was spun at the rate of 6–20 shekels a day per worker (50–167 grams).
- 41 Qualities of wool (sag 'excellent', ús 'ordinary'): STTI 28; ITT I 1364; see further Waetzoldt 1972.
- 42 MAD 1 169; MAD 4 17 = Foster 1982, 70.
- 43 Bridges 1981, 395 (six baskets).
- 44 Foster 2010, 125–127.
- 45 W. Lambert 1975, 108–109 lines 19–20.

8. From Weighing Wool to Weaving Tools. Textile Manufacture at Ebla during the Early Syrian Period in the Light of Archaeological Evidence

Luca Peyronel

The study of ancient textile production in Syria during the Bronze Age is strongly influenced by the presence of three major cuneiform archives dating from the Early Bronze Age (Ebla), Middle Bronze Age (Mari) and Late Bronze Age (Ugarit).¹ These shed light on the development and organization of the textile industry during the 3rd and 2nd millennia BC and its relations with the central administration in a long-term perspective. However, the epigraphic data cannot be used to reconstruct several aspects (particularly the different steps of textile manufacture) of a central sector of the economy during the whole Bronze Age without taking into account the archaeological evidence. This evidence suffers from both the paucity of textile remains and the inadequate publication of archaeological materials relating to textile manufacture. It is therefore not an easy task and in this respect the Ebla evidence is paradigmatic. The overall reconstruction of the textile industry is still a distant objective to be reached, notwithstanding the complete publication of the textile implements dating from the period of the royal state archives (c. 2400–2300 BC)² and the in-depth scrutiny of the epigraphic information regarding textiles³. Nevertheless, the role of Ebla is decisive for the understanding of the processes that led textile manufacture to become a strongly centralized industry, managed and influenced in strategic choices by public power. This is because Ebla is the only site that offers the possibility to combine archaeological and textual information for the period of secondary urbanization in Syria (Early Bronze III and IVA, c. 2700–2300 BC).⁴ A new step of investigation began in 2011 as a part of the Ebla-Chora Project, funded by the European Research Council, in which the study of textile manufacture is included in the research of primary production, manufacture processes, technological degree of specialization and intersections between crafts and exchange systems at local and interregional levels.⁵ For an overall reconstruction of the ancient Eblaic textile manufacture we can combine different sets of data in a multidisciplinary approach that integrates the work of archaeologists, textile technicians, art historians and epigraphists, taking also into account information from experimental studies and ethno-archaeology.⁶

Terms	
Plucking	
Washing and combing	
Spinning = female spinner	
Wgawung = male weaver	
dam tug-nu-tag = female weaver	
Damir = female dyer	
gün = dyer	
dumu-nita tur gün = apprentice dyer	
Heltingdu ₂ = felt maker?	
Wozkrops = atelier	
Guntar = overseer	
Staterom = 'house of the wool'	
e-ti-TÜG = lit. 'house of the ti-TÜG textiles'	
Fibres wool (with quality and color qualifications)	
gada = linen (with quality and color qualifications)	
Ušbala = wooden spindle	
GIS-gäriḡ (<i>ma-za-u</i>) = wooden comb	
na ₄ – 'KIN' – <i>zi-ri</i> = wool measures	
Pro Biga 2010; Pasquali 2010	

Table. 8.1. Epigraphic evidence on textile manufacture (data after Biga 2010; 2011 and ARET I–V, XI–IX, XV–XVI).

The textile industry can be partially reconstructed from the epigraphic evidence of Ebla, on the basis of data gathered especially from administrative documents but also from ritual and religious texts. However, most of the references are concise and strongly biased towards finished products and modes of their distribution.⁷ It is discussed in detail by M. G. Biga both elsewhere and in this volume and therefore the epigraphic information is summarized in Table. 8.1 in relation to the different steps of textile manufacture, which will be here presented focusing on the archaeological materials.

According to the textual evidence, textiles were manufactured mainly from sheep wool (*siki*), but flax was also used to produce linen garments (*gada-TÜG*).⁸ It is interesting to note that some seeds of *Linum usitatissimum* have been identified in the samples collected from Royal Palace G, showing that flax might have been cultivated around Ebla and exploited for oil production but possibly also obtaining textile fibres.⁹

The presence of a large number of sheep flocks under the control of the central administration together with the mention of thousands of textiles distributed by the palace is a clear indication that the production of wool was fundamental for the economy of the kingdom.¹⁰ Zooarchaeological data collected from Building P4 at Ebla show that sheep and goats were the dominant taxa (75.5%) during EB IVA (c. 2400–2300 BC).¹¹ Ovicaprids were slaughtered at young and adult ages, indicating that animals were exploited both for their meat and for their secondary products, primarily wool. Plucking and combing wool happened with the help of wooden combs if it is correct the interpretation of the term *ḡišgäriḡ* (= *ma-za-ù*), rarely attested in the texts, as a textile implement.¹²

A fundamental step linked to the manufacture but also to the administrative procedures of wool and textile distribution was the weighing of the raw material and/or the finished products.

A series of wool measures (na₄ – 'KIN' – *zi-ri*) are attested in the Ebla texts: an investigation of their values allowed Zaccagnini to identify a specific weight

system for wool at Ebla and the ratios between the three units (1 na_4 is a half of KIN and a quarter of *zi-ri*). This system was different from the sexagesimal one adopted for exchange and economic transactions that employed a shekel of 7.8 g, a mina of c. 470 g and a talent of 28 kg.¹³

The use of a mina for wool and textiles is attested in Mesopotamia at the half of the 3rd millennium BC, as clearly indicated in the inscription 'one mina for the wool, Dudu, the high priest' on a conical stone weight of 680 g.¹⁴ However, after the Early Dynastic period the wool system seems to disappear, and the written sources of the IIIrd Dynasty of Ur clearly show that wool was weighed according to the Mesopotamian system based on a mina of 500 g.¹⁵

At Ebla, two hemispherical stone weights can be related to the wool mina and to a double wool mina (666.1 g and 1132 g) (Fig. 8.1). They were found together with other three weights, in the small archive at the corner of the Audience Courtyard.¹⁶ All of them are hemispherical in shape and marked by vertical strokes and horizontal incisions, although the interpretation of the signs is debated.¹⁷ They seem to be interrelated defining a balance set, with the lighter weight corresponding to a western mina of 470 g, identified by a single stroke, and specimens linked to the wool mina and hybrid minas, marked in order to indicate the metrological relation with the local sexagesimal system.

Several small spherical haematite weights from the palace have masses clustered around the value of 6.6 g or its ten-fold multiple of 66 g and some scholars have also related these values to units documented in the Aegean during the Late Bronze Age (Fig. 8.2).¹⁸ Therefore it is very reasonable that a wool mina was used at Ebla, linked to a decimal weight system with a lower unit of 6.6 g, a multiple of 66 g and a mina of c. 650–680 g. The western mina of 470 g can be linked to the system since it can be reckoned as 70 units of 6.6 g. We have no direct evidence to establish a correlation of this presumed system with the metrological measures attested by the written documents. However, if we postulate that the heavier unit, the *zi-ri* could be the mina of the wool, possibly considering it to be the equivalent fixed weight of a sheep's fleece (as happened for example at Nuzi during the Late Bronze,¹⁹ then the KIN might be an half mina and the na_4 a quarter of mina that is 50 and 25 units of 6.6.

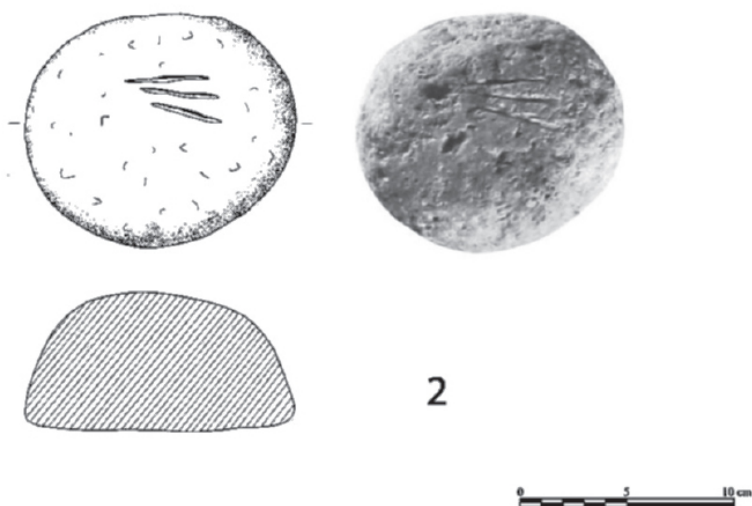
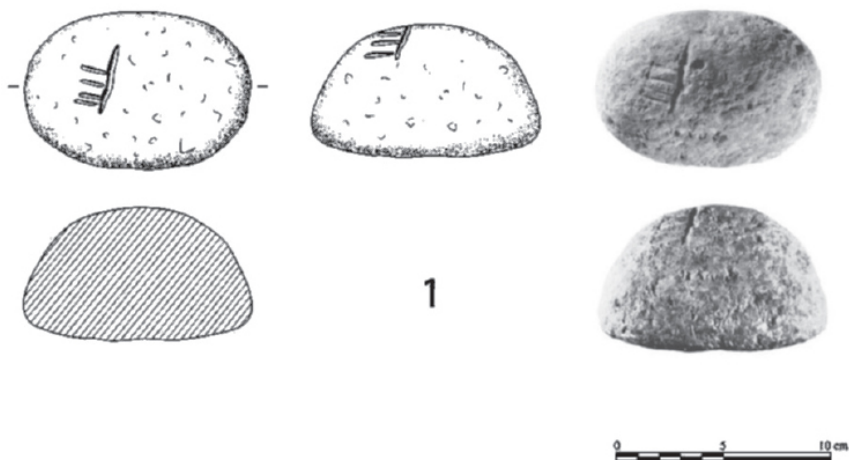


Fig. 8.1. Balance stone weights (1: TM.75.G.1207; 2: TM.75. G.1210) related to the wool system from Royal Palace G, archive L.2712. © MAIS.

The presence of weights possibly linked to the wool system has been also noticed at Tepe Gawra (a double mina of 680 g) and at Byblos, where several pieces attest fractional values of the wool mina ($1/2$ and $1/4$), and their absolute values fit well in the above mentioned Eblaic system.²⁰

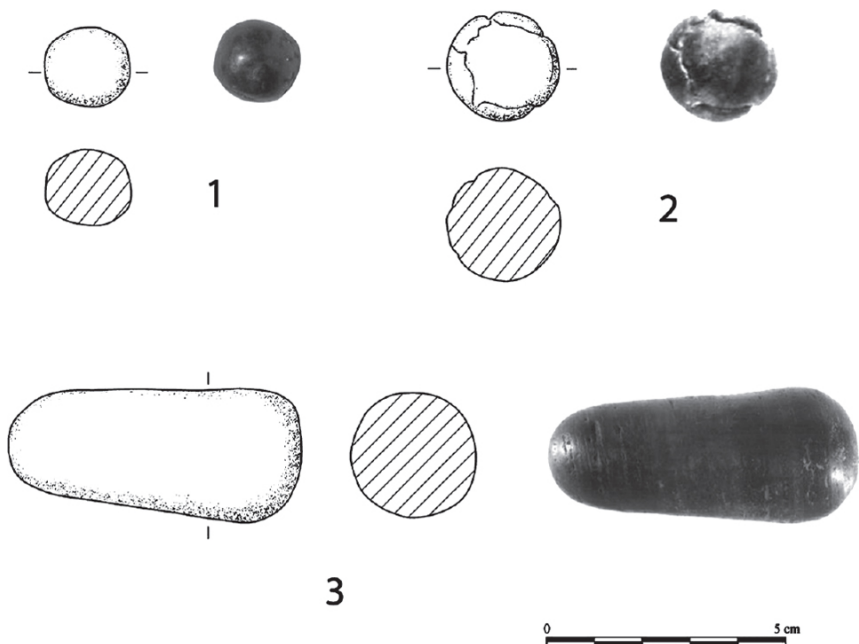


Fig. 8.2. Balance stone weights from Royal Palace G (1: TM.83.G.329 – 6.6 g; 2: TM.83.G.334 – 19.6 g; 3: TM.75. G.366 – 64.2 g). © MAIS.

The use at Ebla of a weight system for wool is also very interesting, since we have unequivocal evidence of the use of wool as means of payment (and standard of equivalence), together with silver.²¹ That use surely depends from the pivotal role of textile industry in the Eblaite economy. Moreover, wool is often given to personnel as monthly ration (together with other products and foodstuffs) and also in change of specific activity and work.²² This situation does not correspond to the evidence of Mesopotamia, where in documents dating from ED II to the Akkadian period, silver seems to be used as a means of payment together with copper and barley, always measured by weight.²³

What can be inferred instead about labour allocation of textile manufacture from the archaeological evidence? The Early Bronze Age IV town is still largely unknown, since it lies below the level of the Middle Bronze Age which is well preserved. The excavations have brought to light only sectors of the Royal Palace G, Building P4, which is a multi-functional public complex located at the foot of the northern slope of the Acropolis. Two temples have been also discovered: the so-called Temple of the Rock, near the south-eastern city-gate, and the Red Temple on the Acropolis, below the Old Syrian temple of Ištar. However, the former was found completely cleaned and ritually sealed during Early Bronze IVB (c. 2300–2000 BC) and the latter has been investigated only through small soundings.²⁴

Among thousands of objects and small finds retrieved in the Royal Palace and in Building P4 only a handful of textile tools are attested: 30 spindle-whorls and 26 bone tools.²⁵

A distributive analysis shows that the tools were found scattered in several

rooms of the Palace G (Central Complex, Southern Wing, Administrative Quarter), without any particular concentration of finds. However, the southern unit of the Central Complex, which was a sector devoted to the storing of preservation jars and vessels of different sizes, shows bone implements and whorls in all of the rooms and textile tools have been collected also in the storerooms and inside the rooms devoted to primary activities related to the grinding of cereals.²⁶ It is interesting to point out that a similar distribution can also be observed for bone decorated sticks/pins with a pointed end which can be considered cosmetic sticks (kohl-sticks), especially those with flattened head.²⁷

On the contrary, precious raw materials and administrative tools (sealings and balance weights) were concentrated in the Administrative Quarters and in the Audience Courtyard, where the archives of the palace have also been found.²⁸

Spindle-whorls have high domed shapes and were made from local stones (limestone and basalt) but also in a black-greyish stone and soft stones, which probably come from the western chains of Jebel Ansariya) (Fig. 8.3).²⁹ These tools, which are usually small and lightweight (between 6 g and 20 g) suggest spinning activity performed by high-ranking members of the palace, since they were found scattered in the palace especially in the collapsed debris of the first floor, which was probably the residential sector of the building.³⁰ They are not indicative of the 'industrial' textile workshops mentioned in the written sources (cf. Table. 8.1), where wooden spindles and spindle-whorls might have been used, as suggested by the rare presence of the term *ḡisbala* in some texts.³¹

However, we have to consider that these spindle-whorls at Ebla come from a palatial context and therefore they cannot be representative of all the spinning at the site. Comparing the evidence of Ebla with the spindle-whorls found at Hama J8-1 (EB IVA-B), where a large quarter of private dwellings have been excavated, we can see that: small and light domed stone whorls of the same Eblaic type are attested in the domestic contexts; several whorls are manufactured from reused pottery sherds; several terracotta whorls are also normally employed to spin.³² Therefore, the contemporary Hama evidence shows that, in household units, a wide range of spindle-whorls, of different materials, sizes and (probably), weights were used to spin the fibres, including terracotta whorls and pierced sherds of pottery, totally lacking at Ebla.

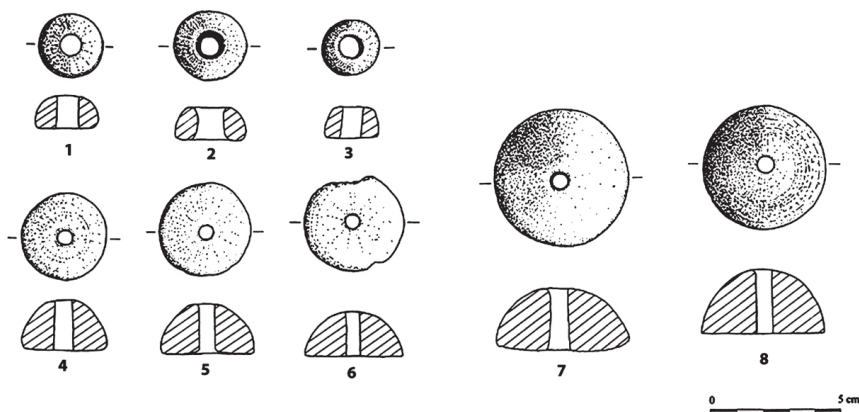


Fig. 8.3. *Stone spindle-whorls from Royal Palace G and Building P4 (1–8: Peyronel 2004, cat. nos 26, 28–29, 31–33, 35–36).*

Several different pointed tools found in the levels dating from the EB IVA at Ebla, usually defined in the literature as punches, awls or needles, could have been used in textile activities.³³ These tools were made from pieces of diaphysis of long bones or metapodials of mammals (especially sheep and goats), sometimes with the distal end (epiphysis) present. The pointed end usually shows clear signs of wear and the surface of the object is frequently smoothed or polished. Two different types of ‘needles’ (5–10 cm in length and 3–5 mm in thickness at the midshaft), characterized by thin section and pierced at one end, are attested: the first with arched section of the shaft opposite to the pointed end and the second with more regular rounded shaft with circular section (Fig. 8.4). All these items could function well as sewing needles for sewing different qualities of fabrics and/or for nadelbinding. Three main types of pointed bone implements without pierced ends can be also distinguished on the basis of their dimensional parameters (Fig. 8.5). This kind of tool can be used in many ways: for piercing leather, for pegging out skins, for manufacturing baskets, and for working several soft materials. However, it also functions well as a so-called pin-beater, a multi-functional weaving tool used to push up the weft after changing the shed or to be thrust up between the weft threads at intervals in order to drive the weft home.

It is well-known that weaving technology during EBA in the Near East employed three main types of looms: the ground-loom, the two-beam vertical loom and the warp-weighted loom.³⁴ However, the introduction, interrelations and technological interactions of these weaving systems is still debated.³⁵ Coastal Syria and the ‘Amuq valley might be considered key regions for the understanding of the development of the two-beam loom and the diffusion of warp-weighted loom in Syria-Palestine, but probably also Inner Syria played an important role in the elaboration of the two-beam loom. The latter type that is attested in Egypt from the Late Bronze Age, as testified by several tomb paintings dating to the New Kingdom, might have been the result of the interaction between the system of the warp-weighted loom and the system of weaving on the ground-loom.³⁶ Although the evidence is scanty in the Levant for that period, the first unequivocal introduction of loom weights (sometimes with scarab seal impressions) in Syria and Palestine is documented already during the Middle Bronze Age.³⁷ It is possible that regions located at the intersection between the technological ‘provinces’ of the warp-weighted loom (Cyprus and Anatolia) and the ground-loom (Mesopotamia) might have been fostered elaborating innovations in weaving technology.



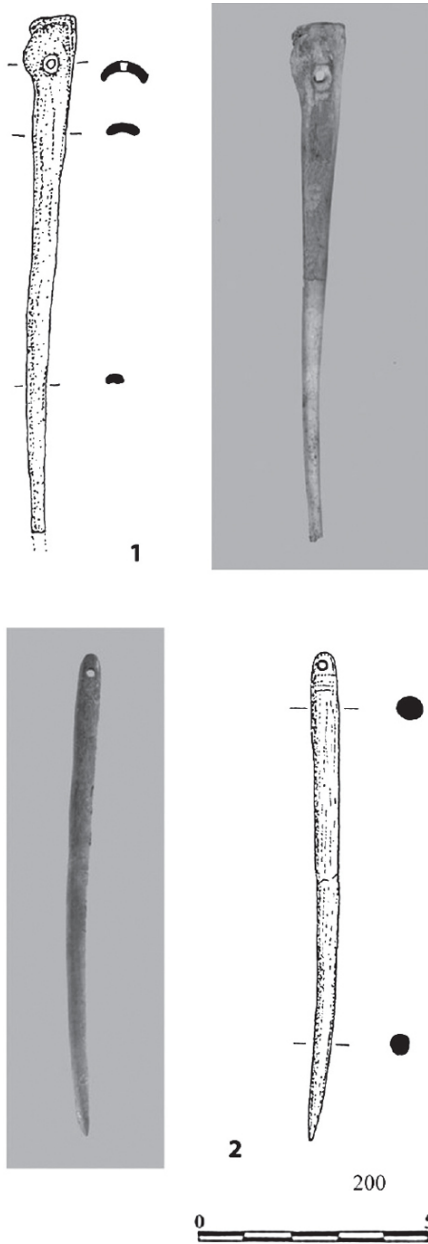


Fig. 8.4. Bone needles from Royal Palace G and Building P4 (1: TM.76.G.592; 2: TM.91. P.679).
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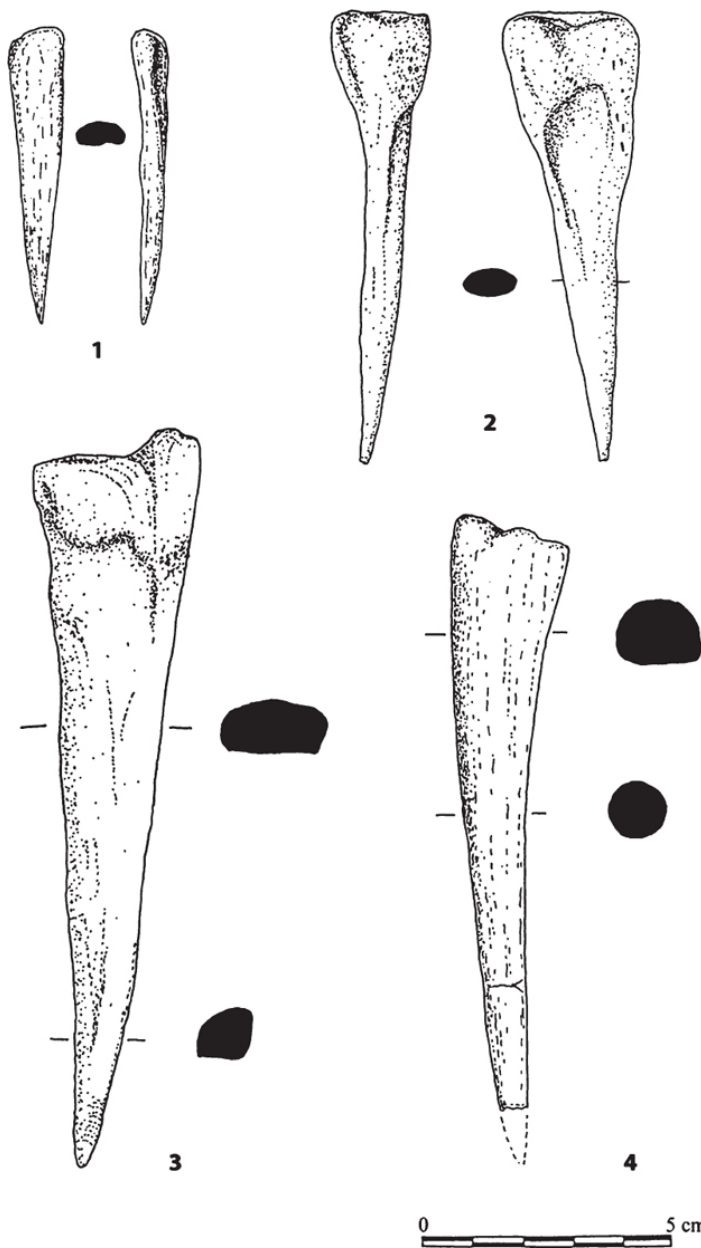


Fig. 8.5. Bone tools from Royal Palace G and Building P4 (1: TM.91. P.141; 2: TM.92.P.531; 3: TM.85.G.348; 4: TM.94.P.701). © MAIS.

At Ebla, loom weights are not attested during the EBA, and only two possible terracotta loom weights have been found in a MBA context.³⁸ Several conical pierced weights in basalt or limestone dating to EB IVA cannot be considered as

loom weights, since they have masses usually exceeding 800–900 g and they have been retrieved scattered in different contexts and never in groups. Some of them, coming from the administrative quarter of the royal palace, are well made and polished. Their function has been established by the discovery of the remains of a wooden balance beam associated with its weights near several pieces of raw lapis lazuli, in a room at the back of the throne-room.³⁹ Therefore at Ebla we have no evidence for the adoption of the warp-weighted loom during the EBA and in my opinion the prevalent use of the horizontal ground-loom in Inner Syria is clear, although it is based on a negative argument (the total lack of proper loom weights in the Syrian region). This defines a technological ‘region’, including all the Levantine area, strongly dissimilar to that in the Anatolian plateau, where the warp-weighted loom was already developed in the 5th millennium BC.⁴⁰ However, it has been argued that the warp-weighted loom, equipped with stone weights, has been attested in the southern Levant since the beginning of EBA, taking into account the evidence of Abu al-Kharaz, where several small pierced doughnut-shaped stones have been found together on floors, together with remains of charred beams.⁴¹ Moreover, the presence of schematic motifs depicted on Uruk and Early Dynastic cylinder seals has led C. Breniquet to suggest the presence of the vertical two-beam and warp-weighted looms were also present in Mesopotamia during the 4th–3rd millennium BC.⁴²

These new data and analyses raise the need for a deeper investigation, which is however severely limited by the documentation available, since a large amount of material is still unpublished and possible weaving tools are only briefly mentioned in the excavation reports as ‘weights’, ‘counter-weights’, ‘pierced stones’ etc., without precise indication of shapes and masses.

Without loom weights and remains of textiles at Ebla during the EB IVA we have no basis to reconstruct the type of textiles produced, the possible numbers of warp and weft threads, the border of the cloth, and so on.⁴³ The only line of investigation possible is cross-checking epigraphic data on finished products and visual data gathered by a composite of statuettes, inlays and glyptic images.⁴⁴ However, this is not an easy task: although we know several types of textiles of different colours and qualities and also specification of provenance (but not weights or dimensions) in the written records, there is no consensus among scholars about meaning of these textile names.⁴⁵ The first and general question is whether they were pieces of cloth and woollen sheets of a standard size or ready-to-wear tailored garments. We have also to consider that pieces of cloth could have been used as wrap-around garments and therefore the problem of interpretation becomes more complicated. The *aktum-TÚG TÚG-ZI.ZI* that is always only given to the king (Fig. 8.6) can be considered as a royal turban, as known from inlays and statuettes. However, almost all the other textiles are given to any type of person, female and male.⁴⁶ The hypothesis of Archi is that the most attested sequence of textiles – ‘*adaum-TÚG*, *aktum-TÚG e ib-TÚG* – might be considered the standard clothing of people at the Ebla court: a cloak, a long robe or a tunic, and a waistband of cloth, folded according to the numerals which follow the term.⁴⁷ According to Biga, the textiles mentioned in the texts are mostly pieces of cloth not yet tailored and she correctly stresses the need to be very cautious in trying to establish precise associations with types of garments, as also suggested by the MBA data from Kaneš and Mari.⁴⁸

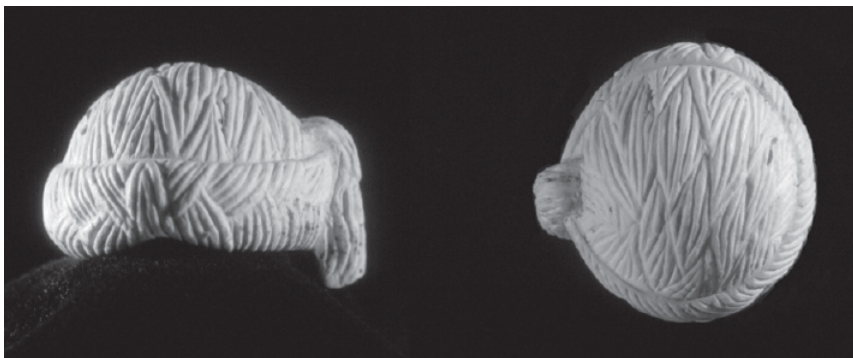


Fig. 8.6. Limestone element of composite statuette, probably representing the royal turban (TM.89.G.268). © MAIS.

However, information from ritual texts attests special clothing worn during ceremonies and the iconography allows us to recognize the main courtly and ceremonial garments at Ebla, especially those for women, as shown by the composite statuettes of the so-called standard of the *maliktum*, where the presumed deified queen mother is represented with a long tunic of the *kaunakes* type made of gold and the queen has a smooth tunic, fringed at the end, completed by a kind of shawl, wrapped around the body (Figs 8.7–8.8).⁴⁹ The extraordinary discovery of six small pieces made from fine gold strips interworked in diagonal plaiting in 2.2 twill is direct evidence of how these garments could have been decorated by precious elements. These pieces are probably the golden decorations of a belt or band used as ornament for a garment, consistent with the mention of textiles made using gold and silver threads for precious clothing in the texts (Fig. 8.9).⁵⁰



Fig. 8.7. Seated female figurine in gold and limestone from L.9583, Royal Palace G (TM.07.G.230). © MAIS.



Fig. 8.8. Standing female figurine in silver and steatite from L.9583, Royal Palace G (TM.07.G.231). © MAIS.

Combining archaeological evidence and written sources related to textiles manufacture at Ebla during the Early Syrian period helps to reach a deeper understanding of the strategic role of wool and textiles in the economic structure of the kingdom. Technological choices of the production seem to be intersected

with ideological aspects of textiles reflected by the visual appearance of clothes and garments, as indicated by the garments that reflect the status and roles of people. Therefore, even without the object of the enquiry itself and, notwithstanding the many unsolved questions arising from the documentation available, we must try to put together all the pieces of evidence, to shed light on the 'life history' of a piece of cloth, from the fleece of a sheep to a veil of a priestess.

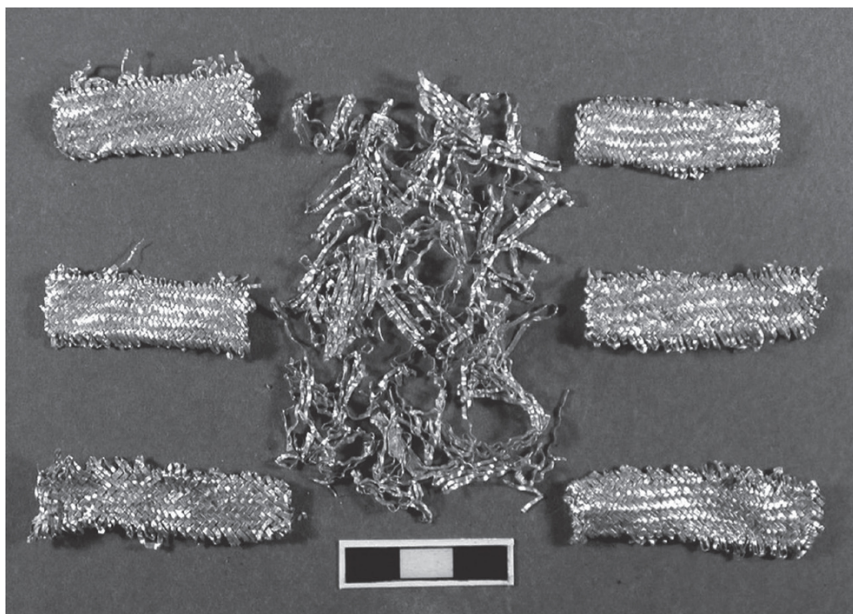


Fig. 8.9. Golden bands from L.8496, Royal Palace G (TM.04. G.170a-g). © MAIS.

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Abbreviations

ARArchives Royales de Mari
 CRAComptes-rendus de l'Académie des Inscriptions et des Belles-Lettres
 MAMari Annales de Recherche Interdisciplinaires
 MEMateriali Epigrafici di Ebla
 NABouvelles Assyriologiques Brèves et Utilitaires
 Or Orientalia
 SAState Archives of Assyria Bulletin
 SEStudi Eblaiti

Bibliography

- Andersson, E., Felluca, E., Nosch, M. L. and Peyronel, L. (2010) New Perspectives on Bronze Age Textile Production in the Eastern Mediterranean. The First Results with Ebla as the Pilot Study. In P. Matthiae, N. Marchetti, L. Nigro and F. Pinnock (eds), *Proceedings of the 6th International Congress on the Archaeology of the Ancient Near East, May, 5th-10th 2008, 'Sapienza' – Università di Roma. Volume 1*, 159–176. Wiesbaden.
- Archi, A. (1984) Allevamento e distribuzione del bestiame ad Ebla. *SEB* 7, 45–82.
- Archi, A. (1987) Reflections on the System of Weights from Ebla. In C. H. Gordon (ed.), *Eblaitica*, 47–89. Winona Lake.
- Archi, A. (1999) Clothes at Ebla. In Y. Avishur and R. Deutsch (eds), *Historical, Epigraphical and Biblical Studies in Honor of Prof. Michael Heltzer*, 45–54. Tel Aviv-Jaffa.
- Ascalone, E. and Peyronel, L. (2006) *I Pesi da bilancia dell'età del Bronzo Antico e Medio. Materiali e Studi Archeologici di Ebla VII*, Roma.
- Baykal-Seeher, A. and Obladen-Kauder, J. (1996) *Demircihöyük. Die Ergebnisse der Ausgrabungen 1975–1978. Vol. IV. Die Kleinfunde. A: Die Litische Kleinfunde; B: Die Kleinfunde aus Ton, Knochen und Metall*, Mainz.
- Biga, M.G. (1992) Les vêtements neufs de l'Empereur. *NABU* 1992, 16–17.
- Biga, M.G. (2010) Textiles in the Administrative Texts of the Royal Archives of Ebla (Syria, 24th Century BC) with Particular Emphasis on Coloured Textiles. In C. Michel and M.-L. Nosch (eds), *Textiles Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 146–172. Ancient Textiles Series 8. Oxford.
- Biga, M.G. (2011) La lana nei testi degli Archivi Reali di Ebla (Siria, XXIV sec. a.C.): alcune osservazioni. In E. Ascalone and L. Peyronel (eds), *Studi italiani di metrologia ed economia del Vicino Oriente Antico dedicati a Nicola Parise in occasione del Suo settantesimo compleanno*, 77–91. Studia Asiatica 7. Roma.
- Breniquet, Ch. (2008) *Essai sur le tissage en Mésopotamie des premières communautés sédentaires au milieu du IIIe millénaire avant J.-C.* Travaux de la Maison René Ginouvès 5, Paris.
- Breniquet, Ch. (2010) Weaving in Mesopotamia during the Bronze Age: Archaeology, Techniques, Iconography. In C. Michel and M.-L. Nosch (eds), *Textiles Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 52–67. Ancient Textiles Series 8. Oxford.
- De Maigret, A. (1980) Riconsiderazioni sul sistema ponderale di Ebla. *Oriens Antiquus* 19, 161–169.
- Desrosiers, S. (2010) Textile Terminologies and Classifications: Some Methodological and Chronological Aspects. In C. Michel and M.-L. Nosch (eds), *Textiles Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 23–51. Ancient Textiles Series 8. Oxford.
- Durand, J.-M. (1990) Review of Ribichini and Xella 1985. *MARI* 6, 659–664.
- Durand, J.-M. (2009) *La nomenclature des habits et des textiles dans les textes de Mari*. ARM 30 = Matériaux pour le Dictionnaire Babylonien de Paris 1, Paris.
- Fischer, P. M. (2008) *Tell Abu al-Kharaz in the Jordan Valley. Volume 1. The Early Bronze Age*. Vienna.
- Frangipane, M. et al. (2009) Arslantepe, Malatya (Turkey): Textiles, Tools and Imprints of Fabrics from the 4th to the 2nd Millennium BCE. *Paléorient* 35, 5–29.
- Langdon, S. H. (1921) Assyrian Lexicographical Notes V. A Mana Stone Weight of the Period of Entemena, *JRAS* 1921, 575–577.
- Laurito, R. (2007) Ropes and Textiles. In M. Frangipane (ed.), *Arslantepe Cretulae. An Early Centralised Administrative System before Writing*, 381–394. Rome.
- Marchesi, G. (2013) Chapter 14. Of Plants and Trees. Crops and Vegetable Resources at Ebla. In P. Matthiae and N. Marchetti (eds), *Ebla and its Landscape: Early State Formation in the Ancient Near East*, 274–292. Walnut Creek.
- Matoian, V. and Vita, J.-P. (2009) Les textiles à Ougarit. Perspectives de la recherche. *UF* 41, 469–504.
- Matthiae, P. (2006) Un grand temple de l'époque des archives dans l'Ebla protosyrienne: Fouilles

- à Tell Mardikh 2004–2005. *CRAI* 2006, 447–493.
- Matthiae, P. (2009) The Standard of the ‘maliktum’ of Ebla in the Royal Archives Period. *ZA* 99, 270–312.
- Matthiae, P. (2010) *Ebla. La città del trono. Archeologia e storia*. Milano.
- Matthiae, P. (2013) Chapter 2. The Royal Palace. Functions of the Quarters and the Government of the Chora. In P. Matthiae and N. Marchetti (eds), *Ebla and its Landscape: Early State Formation in the Ancient Near East*, 49–65. Walnut Creek.
- Matthiae, P. and Marchetti, N. (eds) (2013) *Ebla and its Landscape: Early State Formation in the Ancient Near East*. Walnut Creek.
- McCorriston, J. (1997) The Fiber Revolution: Textile Extensification, Alienation, and Social Stratification in Ancient Mesopotamia. *Current Anthropology* 38, 517–549.
- Michel, C. and Veenhof, K. R. (2010) The Textiles Traded by the Assyrians in Anatolia (19th–18th Centuries BC). In C. Michel and M.-L. Nosch (eds), *Textiles Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 210–271. Ancient Textiles Series 8. Oxford.
- Milano, L. (2003) Sistemi finanziari e circolazione premonetaria in Mesopotamia e in Siria nel III millennio a.C. In L. Milano and N. Parise (eds), *Il regolamento degli scambi neU'antichità (III-I millennio a.C.)*, 3–58. Roma-Bari.
- Minniti, C. (2011) Animal Bones from Tell Tuqan (2007–2009 Excavation Seasons). In F. Baffi (ed.), *Tell Tuqan. Excavations 2008–2010*, 323–334. Galatina-Lecce.
- Minniti, C. (2013) Exploiting Animals. The Zooarchaeological Evidence through the Early Bronze Age at Ebla. In P. Matthiae and N. Marchetti (eds), *Ebla and its Landscape: Early State Formation in the Ancient Near East*, 413–430. Walnut Creek.
- Pasquali, J. (1997) La terminologia semitica dei tessuti di Ebla. *Miscellanea Eblaitica* 4, 217–270.
- Pasquali, J. (2005) Remarques comparatives sur la symbolique du vêtement à Ebla. In L. Kogan et al. (eds), *Memoriae Igor M. Diakonoff* (Babel und Bibel 2), 165–184. Winona Lake.
- Pasquali, J. (2010) Les noms sémitiques des tissus dans les textes d'Ebla. In C. Michel and M.-L. Nosch (eds), *Textiles Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 173–185. Ancient Textiles Series 8. Oxford.
- Peyronel, L. (2004) *Gli Strumenti di tessitura dall'Età del Bronzo all'epoca Persiana. Materiali e Studi Archeologici di Ebla IV*. Roma.
- Peyronel, L. (2006) Il Palazzo e il Mercante. Riflessioni sui sistemi di scambio nella Siria del III Mill. a.C. In C. Mora and P. Piccentini (eds), *L'ufficio e il documento. I luoghi, i modi, gli strumenti dell'amministrazione in Egitto e nel Vicino Oriente antico. Atti delle Giornate di studio degli Egittologi e degli Orientalisti italiani, Milano-Pavia, 17–19 febbraio*, 257–280. Milano.
- Peyronel, L. (2007) Spinning and Weaving at Tell Mardikh-Ebla (Syria). Some Observations on Spindle-Whorls and Loom-Weights from the Bronze and Iron Ages. In C. Gillis and M.-L. Nosch (eds), *Ancient Textiles. Production, Craft and Society. Proceedings of the First International Conference on Ancient Textiles, Held at Lund, Sweden, and Copenhagen, Denmark, on March 19–23, 2003*, 26–35. Oxford.
- Peyronel, L. (2011) *Mašqaltum kittum*. Questioni di equilibrio: Balance e sistemi di pesatura nell'Oriente antico. In E. Ascalone and L. Peyronel (eds), *Studi italiani di metrologia ed economia del Vicino Oriente Antico dedicati a Nicola Parise in occasione del Suo settantesimo compleanno* (= *Studia Asiana* 7), 105–161. Roma.
- Peyronel, L. (2012) Il sovrano e la bilancia. Valenze ideologiche e significati metrologici nella Mesopotamia del III millennio a.C., *Annali dell'Istituto Italiano di Numismatica* 58, 9–30.
- Peyronel, L. and Vacca, A. (2013) Chapter 26. Natural Resources, Technology and Manufacture Processes at Ebla. A Preliminary Assessment. In P. Matthiae and N. Marchetti (eds), *Ebla and its Landscape: Early State Formation in the Ancient Near East*, 431–449. Walnut Creek.
- Pinnock, F. (1992) Le ‘turban royal éblaïte’, *NABU* 1992, 15–16.
- Pomponio, F. (2008) Note sui tessuti nella documentazione di Ebla. Il periodo di Arrugum. In M. Perna and F. Pomponio (eds), *The Management of Agricultural Land and the Production of Textiles in the Mycenaean and Near Eastern Economies* (Studi Egei e Vicinorientali 4), 101–109. Paris.
- Ribichini, S. and Xella, P. (1985) *La terminologia dei tessuti nei testi di Ugarit*. Roma.
- Sallaberger, W. (2004) A Note on Sheep and Goat Flocks. Introduction to Texts 151–167. In L. Milano, W. Sallaberger, P. Talon and K. Van Lerberghe (eds), *Third Millennium Cuneiform Texts from Tell Beydar (Seasons 1996–2002)* (Subartu 12), 13–21. Turnhout.

- Sallaberger, W. (2009) Von der Wollration zum Ehrenkleid. Textilien als Prestigegüter am Hof von Ebla. In B. Hildebrandt und C. Veit (eds), *Der Werg der Dinge – Güter im Prestigediskurs. 'Formen von Prestige in Kulturen des Altertums'* Graduiertenkolleg der DFG an der Ludwig-Maximilians-Universität München, 241–278. München.
- Van Soldt, W. H. (1990) Fabrics and Dyes at Ugarit, *UF* 22, 321–357.
- Vita, J.-P. (2010) Textile Terminology in the Ugaritic Texts. In C. Michel and M.-L. Nosch (eds), *Textiles Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 323–337. Ancient Textiles Series 8. Oxford.
- Wachter-Sarkady, C. (2013) Chapter 23. Consuming Plants. Archaeobotanical Samples from Royal Palace G and Building P4. In P. Matthiae and N. Marchetti (eds), *Ebla and its Landscape: Early State Formation in the Ancient Near East*, 376–402. Walnut Creek.
- Waetzoldt, H. (2001) *Wirtschafts- und Verwaltungstexte aus Ebla* (MEE 12), Roma.
- Zaccagnini, C. (1981) A Note on Nuzi Textiles. In M. A. Morrison and D. I. Owen (eds), *Studies on the Civilization and Culture of Nuzi and the Hurrians in Honor of Ernest R. Lacheman*, 349–361. Winona Lake.
- Zaccagnini, C. (1984) The Terminology of Weight Measures for Wool at Ebla. In P. Fronzaroli (ed.), *Studies on the Language of Ebla* (Quaderni di Semitistica 13), 189–204. Firenze.
- Zaccagnini, C. (1990) The Nuzi Wool Measures Once Again, *Or* 59, 312–319.
- Zaccagnini, C. (1999–2001) The Mina of Karkemiš and Other Minas, *SAAB* 13, 39–56.

1 For a comprehensive analysis of the textiles and garments mentioned in the Mari archives see Durand 2009. The epigraphic data from Ugarit have been studied in particular by Ribichini and Xella (1985; see also the review of Durand 1990), Van Soldt (1990), and recently by Vita (2010). An analysis that tries to combine epigraphic and archaeological data has been recently carried out by Matoian and Vita (2009; see also the article in this volume).

2 The study of the archaeological data related to the Eblaic textile industry, following the publication of spinning and weaving tools dating from the Early Bronze Age III up to the Persian period (Peyronel 2004; see also 2007), has been carried out between 2005 and 2010 in collaboration with the Danish National Research Foundation's Centre for Textile Research (CTR) in the Project *Textile Production in Bronze Age Eastern Mediterranean: Tools and Textiles*: the results of the CTR project are summarized in Andersson *et al.* 2010.

3 The epigraphic data, widely studied and published by several scholars (see *infra*), have been recently summarized by Biga (2010) and Pasquali (2010) in the 8th volume of the Ancient Textile Series, *Textile Terminologies*, as a result of the CTR project section *Texts and Contexts*.

4 For the development of textile industry in Mesopotamia during the urban revolution and the Early Dynastic Period (IV–III Millennium BC) see McCorriston 1997 (with an emphasis on the process changes started with the exploitation of animal fibre); Breniquet 2008; 2010.

5 For the initial results of the research see Matthiae and Marchetti 2013; especially Peyronel and Vacca 2013.

6 Experimental research on Eblaic textile tools (spindle whorls and loom weights) have been carried out by the CTR team and briefly reported in Andersson *et al.* 2010, 164–167; see the full-report at http://ctr.hum.ku.dk/tools/toolsreports/Ebla_Technical_textile_Tools_Report.PDF/.

7 Cf. especially Pasquali 1997; 2005; 2010; Archi 1999; Pomponio 2008; Sallaberger 2009; Biga 2010; 2011.

8 Biga (2010, 156–157) has summarized data regarding linen textiles, observing that linen fabrics occur in small quantities in all the monthly accounts of textiles, distributed to different hierarchical levels of the Eblaic society, but especially to members of the royal and vizir's families. They were often used to equip equids and chariots and sometimes used to manufacture peculiar objects.

9 Wachter-Sarkady 2013, 384, fig. 23:4. Marchesi (2013, 276) has proposed that the *hapax legomenon* GIB.GARIĠ.TUR could have been interpreted as linseed, on the base of the meaning of GARIĠ (= comb, possibly the flax-ripping comb that was used to rid the flax stalks of their seeds).

10 Ebla controlled a large amount of herds through head-shepherds, and Archi estimated that the number of sheep directly controlled by the palace was between 80.000 and 100.000 heads (Archi 1984). The administrative records from Tell Beydar, ancient Nabada (contemporary to the Ebla archives) show a similar situation, with sheep and goats entrusted to shepherds (*ba-ri* udu) controlled by the central institution. These records also record that the plucking of the wool from the sheep took place during spring (Sallaberger 2004).

11 See Minniti 2013, 414–416; also 2011, 323–324, tab. 1 for the faunal evidence from Tell Tuqan dating to Early Bronze Age III (c. 2700/2600–2450 BC).

- 12 Pasquali 1997, 260–261; Biga 2011, 78–79.
- 13 Zaccagnini 1984. On the weight systems at Ebla see Archi 1987. The Early Bronze Age IV balance weights are published in Ascalone and Peyronel 2006, 75–124; on weighing procedures at Ebla also Peyronel 2011, 110–111.
- 14 Langdon 1921; see also Peyronel 2012, 13–14. It is important to note that this mina can be also understood as 80 shekels of 8.4 g, making possible the conversion to the Mesopotamian standard: Parise 1991.
- 15 Breniquet (2008, 274–278) has suggested that the weighing of wool could be depicted on some cylinder seals dating to the Uruk and Early Dynastic periods, however, although these scenes represent weighing using a balance, there is not a definite link with textile activity: Peyronel 2011, 114–115.
- 16 Archi 1987, 58–59, nos 21–25; Ascalone and Peyronel 2006, 90–92, 113–121, 186–189, cat. nos 48–58.
- 17 According to Archi (1987, 47–48) the marks might be interpreted as metrological notations proceeding from two minas with the subtraction of 1/5 fractions ($1 + 1/5$, $1 + 2/5$), *contra* De Maigret (1980, 165–167) who considered the signs were an indication of subtraction of 1/6 fractions ($1 + 1/6$, $1 + 1/3$); Zaccagnini suggests that the weights of 666 and 1132 can be related to the wool system and also that hybrid minas are attested in the balance set (1999–2001, 40, 48–49). This hypothesis is followed and specified by Ascalone and Peyronel (2006, 113–121); in particular, Ascalone put forward the possibility that the marks were made in order to indicate the metrological relation between the western mina of c. 470 g and the other minas (the wool mina of c. 660 g and hybrid minas of c. 420 g and c. 564 g).
- 18 Ascalone and Peyronel 2006, 100–104, 160–164. See also Zaccagnini 1999–2001, 48–51.
- 19 Zaccagnini 1981; 1990.
- 20 Ascalone and Peyronel 2006, 301–302, TGA.27 (Tepe Gawra), 281–282, BI.128–129, 146 (Byblos). However, the Gublite weights cannot be precisely dated and they could be later than the Gawra and Ebla specimens.
- 21 Biga 2011, 33–34. The use of wool as a means of payment is attested particularly during fears (KILAM) at Ebla and in other towns: see Biga 2002; 2003.
- 22 Biga 2011, 34–37 and in this volume.
- 23 Milano 2003, 12–30.
- 24 Matthiae 2010, 64–93, 377–396 and 2013 with previous references.
- 25 The number refers to the objects retrieved during the 1965–2006 campaigns: Andersson *et al.* 2010, 161.
- 26 For a contextual analysis of the findings see Peyronel 2004, 114–115 (spindle-whorls), 137–138 (bone implements); also Andersson *et al.* 2010, 161.
- 27 Four main types of cosmetic sticks have been found in the Royal Palace and Building P4 at Ebla: sticks/pins with worked head, hourglass- or spatula-shaped, pierced immediately under the head, without decoration (10–15 cm in length); small sticks/pins with worked head, globular-shaped; incised decoration with parallel lines and crossing lines, usually pierced in the part between the two patterns of lines (c. 8–10 cm in length); sticks/pins similar to previous one but longer, c. 20 cm in length; pins with simple rounded heads, pierced or unpierced.
- 28 Peyronel 2006 for the distribution of precious raw materials, *cretulae*, cuneiform tablets, and balance weights in relation to the administrative procedures carried out in the public building.
- 29 Peyronel 2004, 104–114; 2007, 27–28.
- 30 The texts record that quantities of wool were delivered to the queen mother, to the queen and to women of the court as raw material to make textiles confirms this hypothesis: Biga 2011, 29–30. Moreover, the variation of the weights of the spindle-whorls probably indicates that they were employed for spinning small quantities of thin fibres. This is also suggested by experimental spinning tests carried out by the CTR team, in order to verify the possibility of spinning with small light whorls such as the specimens found in the palace (wool fibres were tested on spindle-whorls of 18 g, 8 g and 4 g, respectively, while flax fibres were only tested on the 8 g whorl): Andersson *et al.* 2010, 164–165.
- 31 Biga 2011, 78–79.
- 32 See Peyronel 2004, 117–119 for the Hama J textile tools.
- 33 Peyronel 2004, 132–145.
- 34 Barber 1991, 83–116; Peyronel 2004, 59–72; Breniquet 2008, 133–194.
- 35 Peyronel 2004, 390–392; 2007, 33–34.
- 36 Peyronel 2004, 63–64; 2007, 34.
- 37 Peyronel 2004, 199–210.
- 38 Peyronel 2004, 199–210, with comparisons from MBA Palestinian sites; 2007, 30. Following the CTR calculations, based on the weight and thickness of the loom-weights, a warp thread of 10 g or 20 g

tension would function well, but producing fabrics that are visually completely different: Andersson *et al.* 2010, 165–167.

39 Ascalone and Peyronel 2006, 73, tipo 10, cat. nos 71–75; Peyronel 2011, 110–111. All these weights but one (which is a double hybrid mina of 553 g) have masses corresponding to a double western mina of c. 470 g and they were certainly used to check the weight of semi-precious stones.

40 See e.g. Frangipane *et al.* 2009 (Arslantepe); Baykal-Seeher and Obladen-Kauder 1996, 237–244 (Demircihöyük).

41 Fischer 2008, 50–54, 352–354.

42 Breniquet 2008, 293–313. Notwithstanding the hypothetical identification of some representations, Breniquet's 'iconographical approach' is particularly important for the study of the Mesopotamian textile industry during the 4th–3rd millennium BC, allowing us to shed some light on several steps of the manufacturing process, which are virtually 'invisible' on archaeological grounds alone.

43 Several clay sealings retrieved in the Royal Palace G preserve textile impressions on the back, which seem to be always related to plain tabby weave imprints, although a more detailed analysis is necessary to identify precisely the number of threads/cm, the direction of spinning of the fibres, the presence of different kind of clothes (coarse vs. fine), etc. As a reference point of the analysis of textile imprints on *cretulae*, see Laurito 2007.

44 For a first attempt to correlate some textile terms with the garments reproduced on inlays and composite statuettes from Mari and Ebla, see Sallaberger 2009, 258–270.

45 Waetzoldt 2001, where the different translations of Eblaite textile terms are quoted.

46 Biga 1992; 2010, 155–156; Pinnock 1992.

47 Archi 1999.

48 Biga 2010, 150–151; Michel and Veenhof 2010 for Kaneš, and Durand 2009 for the Mari evidence.

49 Matthiae 2009.

50 According to P. Matthiae (2006, 455, fig. 8) these gold bands may have decorated “un costume cérémoniel, comme un corset, une tiare ou une ceinture”; Biga 2010, 159; Desrosiers 2010, 31, fig. 3.9.

9. Some Aspects of the Wool Economy at Ebla (Syria, 24th Century BC)

*Maria Giovanna Biga*¹

1. The sources for the study of the wool at Ebla

The texts of the principal royal archive of Ebla (North Syria, 24th century BC) provide a wealth of information on the textiles and the wool produced, used and exchanged in Ebla itself and in the Syrian region and upper and central Mesopotamia. After many years of study of the Ebla archives, it became evident that monthly accounts of textiles and wool were kept in the principal archive L.2769 and not in the other archives. Very few texts registering deliveries of textiles were kept in the other Ebla archives such as L. 2586, L.2875, L.2764, L.2712, all archives dating to the last years of Ebla. It is quite probable that these accounts were not yet copied in a monthly account of textile deliveries to be later stored in the main archive.²

The monthly accounts register the deliveries of textiles and wool to various people on several occasions, every month. Most of these accounts concern ceremonial gifts sent to the courts of Ebla's closest allies who, in turn, made gifts of wine, animals, different kinds of food and various goods to Ebla. Textiles were undoubtedly Ebla's most important product.³ The Eblaite textiles were mostly made of wool.⁴

Wool is quoted mostly in the administrative texts dealing with deliveries of textiles. At the beginning of the studies of textile texts there were a thousand tablet inventory numbers, including both large and smaller fragments.⁵ Now, after many joins have been made among these fragments, it is possible to estimate that, in the principal archive, c. 600 tablets of textiles and wool were kept. Thus far less than 25% of the monthly accounts of textiles have been published in volumes of the ARET or MEE series. Because in some months, on particular occasions, two monthly accounts of textiles were written,⁶ we can deduce a maximum time frame of something less than 50 years documented by textile accounts.⁷ At the end of almost all the monthly textile accounts of the Ebla tablets, in the last columns of the reverse, the deliveries of wool are registered. Sometimes, the scribes left some columns empty, to separate the two types of deliveries, and then, in the last columns, registered the wool. Following this were the partial total and the general total of the textiles, then the month name, as it is possible to verify from photos of texts ARET I 11, 13, 14, 16, and ARET IV 3, 5, 10, 17, 21.

Normally the textiles are registered in a careful writing, which is better than that

used for the registration of wool. Sometimes the scribe did not calculate exactly the space he needed; in these cases he was compelled to write using small signs, and it is more difficult to read the last columns regarding the deliveries of wool. Very often the obverse and a part of the reverse of a monthly account of textiles are written in a clear script; but unfortunately the columns with the registration of quantities of wool are written with very small signs difficult to read. And normally, the last columns are the most damaged, broken, because they are closer to the edge of the tablet that is often broken. A lot of information on wool is lost or, better, is in the thousands of very small fragments kept in the storeroom of Idlib museum. Sometimes registration of quantities of wool was written when the tablet was already dry and was engraved and not inscribed on the tablet. Lastly, the edges are often dirty and difficult to clean, and many tablets still have to be cleaned.⁸

The information available on wool, its production, its uses for different purposes, from the textiles tablets is huge and work on the wool economy at Ebla will be in progress for a long time.⁹ The quantities of wool delivered are usually not counted in the total sums at the end of the text. When some large quantities are delivered they are counted and totalled at the end of the text. In some cases, but not frequently, quantities of wool are distributed to some people with textiles (or instead of textiles). Some important women of the court sometimes received wool from the central administration, on particular occasions, probably to produce their own fabrics. And also men sometimes received wool together with textiles as a gift from the Ebla court. But normally the quantities of wool are registered in the last columns of the texts. Very few texts are almost completely devoted to registration of deliveries of wool as for example TM.75.G.1319, a tablet of the time of minister Ibrium, when Dusigu, the queen mother, was the most important lady at the court and Gisadu, the wet-nurse of the last king Išar-damu, was also well very active at the court.¹⁰

2. The production of wool

Wool was produced by hundreds of thousands of sheep under the control of the Eblaite central palatial organization. In certain small texts an extraordinarily large number of sheep are quoted, more than one hundred thousand.¹¹ But the production of wool from the flocks of sheep is not given by the Ebla texts, as for example was written in some texts from Tell Beydar, ancient Nabada.¹² As the Wool Economy conference in Nanterre highlighted, there were several types of sheep in ancient Syria (as well as in the Near East and Europe), producing different quantities and qualities of wool.¹³ The palace of Ebla had large quantities of wool available for the production of fabrics. Apparently wool from Ebla was insufficient as the texts quote wool bought by merchants in the kingdom of Mari on the Middle Euphrates, in the kingdom of Armi and in that of Nagar. Eblaite merchants were responsible for different goods; Iram-malik had chariots full of wool traveling outside the territory of Ebla and in the Euphrates valley, between Emar and Tuttul.¹⁴ In text ARET XIII 15 Eblaite merchants go to Mari to buy wool.¹⁵ Wool came to Ebla sometimes as a gift from foreign kingdoms. Among the goods arriving into the Eblaite storerooms, brought by the 'Lords' and sent by foreign kingdoms and registered in the so called 'mu-DU' texts, there are few quantities of wool. These texts mostly record textiles, metal objects and quantities of metals

etc...¹⁶

The most important storeroom in the city of Ebla was called 'house of wool' (é-siki), probably because originally wool was the most important product kept in this storeroom. The records show different metals and metal objects coming out of this storeroom over the years and this is proof that other goods were also kept later in this house of treasure. The other important storeroom was the 'house of "ti"-textiles', although this was undoubtedly less important than the 'house of wool'.

3. Weight measures for wool

One of the first operations carried out on the wool once plucked was weighing, and this was already documented on some seals of the early 3rd millennium BC. These seals were recently identified by Breniquet.¹⁷ The weighing scenes on the seals were previously interpreted in various ways because it was not easy to recognize the various kinds of weighing scales being used to weigh the wool.

Measures to weigh wool are documented in the ancient Near East from the Proto-Dynastic period. The Proto-Dynastic weight with the inscription of Dudu, temple administrator, is well known and also the type of weight: '(one) mina (to measure) wool rations'.¹⁸

We know the measures used by Eblaites to weigh the wool: na_4 , (GIŠ)'KIN', $zi-rí$. These measures are typical of Ebla and not known from other regions of Syria so far. C. Zaccagnini, in early Eblaite studies, in 1984, was able to establish their reciprocal value: $1\ zi-rí = 2\ 'KIN'$; $1\ 'KIN' = 2\ na_4$.¹⁹

It has been impossible so far to know the weight of each one. In any case the biggest measure was the *ziri* (from Akk. *zāru* = to twist), possibly a skein of wool. Its value was 2 (GIŠ)·'KIN' and 4 na_4 ; 2 na_4 were 1 (GIŠ)·'KIN'. A measure na_4 mah is also documented; (GIŠ)-bala, the wool of a spindle, was possibly the smallest measure for wool.

(GIŠ)·'KIN' was perhaps initially a basket made of wood for wool.²⁰ The scribes at the time of viziers Ibrium and Ibbi-zikir often omitted the sign GIŠ.

In some rare cases texts do not mention the measures of wool but simply the wool of two sheep as if the quantity of wool that could be obtained from them was well known. In both versions of the ritual for renewal of royalty at Ebla, the queen gives to a woman the wool of two sheep for the weaving of a particular textile to be used in the ritual.²¹

4. Types and colours of wool

In Ebla, as elsewhere in the Near East, different types of sheep supplied different qualities and quantities of wool.²² The Ebla texts register wool of premium quality (sag), good (sa₆), of inferior quality (ḫul), selected (*ba-ra-i/u₉*), plucked (*ni-za-ù*).²³

Wool could be white (babbar), black (gi₆), dyed dark-red (ú-ḫáb) or probably also in other colours for ex. yellow. The dark-red colour was probably obtained from the gall-nut, often quoted in the Ebla texts. The word 'gùn' translated as 'multicoloured' refers probably to a variety of wool obtained directly from certain types of sheep and not to a colour obtained with dye.²⁴

5. Uses of wool

Wool was used in different ways and for different purposes. It was used to produce first of all fabrics, felts, but also blankets, pillows, cushions, carpets and ropes, equipment of chariots and equids; it was given to people of the temples for different purposes; it was used as payment in exchange of goods and services, etc.²⁵

5.1. *Fabrics, felts, cushions*

Several names of different fabrics are quoted in the texts.²⁶ Despite the frequency of the quotations of textiles it is difficult to identify the types of textiles. It must be emphasized once more that the texts quote fabrics and not garments as can be deduced from the fact that different fabrics are cut and given to different persons.²⁷

In the texts it is sometimes noted how much wool was necessary to make a fabric; all these examples must be collected to verify if quantities of wool to produce a fabric were standard and which textiles required more wool.²⁸ Given the fact that we do not know the precise weight of the measures, it is difficult to reach definitive conclusions but this study can help in the identification of the types of textiles.

For example, in TM.75.G.10273 (king Išar-damu, vizier Ibbi-zikir, month *za-lul*) rev. XVI 8–10: 60 ‘KIN’ siki tóg-nu-tag 30 gu-zi-TÚG Na[...] ; 60 ‘KIN’ measures of wool are necessary to weave 30 guzitum-textiles, i.e. two ‘KIN’-measure for one guzitum-textile.

It was well established from the beginning of Eblaite studies that 2 ‘KIN’-measures of wool was the standard weight of normal felts manufactured at Ebla.²⁹ More evidence for wool necessary to produce felts and other textiles was provided by other published texts and from unpublished texts.

TM.75.G.2573 (king Išar-damu, vizier Ibbi-zikir, month lost) rev. VII 1–17: 40 ‘KIN’ siki tóg-nu-tag 20 tóg-du₈ *Bar-za-ma-ù* ugula *A-ru₁₂-ga-du^k* 40 ‘KIN’ siki 20 tóg-du₈ *I-rí-gu* 40 ‘KIN’ siki 20 tóg-du₈ ‘*À-lik*’ 40 ‘KIN’ siki 20 tóg-du₈ ‘*Íl-gú-uš-ti*’ 40 ‘KIN’ siki 20 tóg-du₈ ‘*Û-ti*’.

TM.75.G. 2511 + 10139 (king Išar-damu, vizier Ibbi-zikir year 2, month M_AxGÁN_Atenû-gu_{du}₄) rev. X 18–24: 1 *mí-at* ‘KIN’ siki tóg-nu-tag 50 tóg-du₈ *wa* 50 ‘KIN’ siki tóg-nu-tag 2 *mí-at* níg-lá-gaba;³⁰

rev. XI 12–19: 4 ‘KIN’ siki tóg-nu-tag 2 tóg-du₈ *I-bí-zi-kir wa Sa-gu-lum Ik-su-ud* šu ba₄-ti.

TM.75.G.2419 + 11653 (king Išar-damu, vizier Ibbi-zikir last years, month lost) rev. XI 1–24, XII 1–18: 40 ‘KIN’ siki 20 tóg-du₈ ‘*À-lik*’ 40 ‘KIN’ siki 20 tóg-du₈ *Nu-ga-mu* 40 ‘KIN’ siki 20 tóg-du₈ ‘*Ħu-za-an^{ki}*’ 40 ‘KIN’ siki 20 tóg-du₈ *A-da-áš^{ki}* 40 ‘KIN’ siki 20 tóg-du₈ *A-ba-zu^k* 40 ‘KIN’ siki 20 tóg-du₈ *Kul-ba-an^{ki}* 40 ‘KIN’ siki 20 tóg-du₈ *Ir-ti* 40 ‘KIN’ siki 20 tóg-du₈ [x]-mu-[x] 40 KIN siki 20 tóg-du₈ *Bar-za-ma-ù* 40 KIN siki 20 tóg-du₈ *Ik-du-lu^{ki}* 40 KIN siki 20 tóg-du₈ *A-ti* 40 KIN siki 20 tóg-du₈ ‘*Íl-gú-uš-ti*’ 40 KIN siki 20 tóg-du₈ *Dag-ba-al^{ki}* 40 KIN siki 20 tóg-du₈ *A-lu*-[x]-šè.³¹

Several texts register wool destined to produce cushions, but often they do not give the number of cushions produced and it remains difficult to establish how much wool was necessary for one cushion.

TM.75.G.2439 rev. XII 13–16: 2 ‘KIN’ siki *ba-ra-i* túg-nu-tag ú-su ú-su GIŠ-uštin GIŠ-uštin.

5.2 Wool for the equipment of chariots and equids

Large quantities of wool were distributed to functionaries responsible for the equipment of donkeys and equids and chariots of the king, the queen, the queen mother, some princes, the vizier and of some of the most important functionaries of the court.³² In 1997, G. Conti produced an important study on the numerous objects made of wool which form part of the equipment for donkeys, equids and wagons.³³ Almost all the textile texts register deliveries to functionaries for the equipment of equids and they have to be studied chronologically to verify how often these personages received wool for equids.

See for example TM.75.G. 2511 + 10139 (king Išar-damu, vizier Ibbi-zikir year 2, month MAXGĀNAtenū-gudu₄) rev. XI 7–11: 10 ‘KIN’ siki níg-anše-ak níg-anše-ak eškiri_x eškiri_x GIŠ-gigir-é GIŠ-gigir-é *Wa-ba-rúm* šu ba₄-ti.

TM.75.G. 2435 + (king Išar-damu, vizier Ibbi-zikir year 3, month še-KIN-II) rev. IX 11–18: 2 ‘KIN’ siki níg-anše-ak eškiri_x 3 ‘KIN’ siki *ba-a-nu ba-a-nu* bîr-BAR.AN IGI-NITA en wa ama-gal-sù wa *I-bí-zi-kir Ik-su-ud* šu ba-ti₄ 5 ‘KIN’ siki *ba-a-nu* 5 u₅ gaba-ru *Be-sù-lu_x* šu ba₄-ti 1 na₄, siki 1 íb + III-TÚG ^dA₅-da-bal 1 ‘KIN’ siki 2 níg-anše-ak 1 eškiri_x *I-rí-ik-da-mu* 1 na₄ siki 1 eškiri_x *A-ḥar-da-mu Be-su-lu_x* šu ba₄-ti

5.3. Wool for the temples

Quantities of white and/or black wool were given to the temples of Ebla as regular offerings; quantities of wool were also destined for statues of the temples, to temples’ functionaries and priests for different occasions and rituals.³⁴ The colours of the wool for weaving textiles used in rituals were not chosen by chance and can give important information on the type of ritual performed.³⁵

5.4. Wool to purchase goods, especially at fairs

Wool was the product present at Ebla in large quantities. For this reason the palace of Ebla paid for some goods using wool, especially for purchasing goods at fairs.³⁶ It is well known from Mesopotamia that Mesopotamian people paid with barley, the most common product. This important use of wool at Ebla must be emphasized.

Fairs were frequent in Ebla region and in other Syrian kingdoms.³⁷ The goods purchased at fairs were especially: gall-nuts and other natural dye materials for fabrics and wool, some resins and precious wood to produce oil and perfumes, possibly also bitumen (im-gi₆).³⁸

Sometimes both wool and textiles were used to pay for goods. See for example TM.75.G.2501 (king Išar-damu, vizier Ibbi-zikir, month lost) obv. VII 13-VIII 2: 1 gu-mug-TÚG 1 ‘KIN’ siki níg-sa₁₀ GIŠ-ád kin₅-ak ì-gi₈ gibil ^dÁš-da-bū.

5.5. Wool as ration/payment for different services to different people

Wool was used as a payment/ration for several categories of workers. These are usually occasional payments for different tasks rather than for regular rations.

Wool was given to women, including the important women of the court, including the queen and the queen mother to make fabrics, blankets, pillows, cushions, carpets or ropes and also textiles for deities. More texts must be studied

in chronological order, year by year and month by month, to determine the frequency of these deliveries. It is already possible to recognize at least 30 monthly accounts of textiles for the first three years of Ibbi-zikir as vizier. From the study of these texts, it can be deduced that we are not actually dealing with rations of wool to women of the court.³⁹ Given the fact that we are dealing with the most important women of the court it is possible that they received wool on particular occasions.⁴⁰ However, the occasions marked by deliveries of wool to these women are not recorded in the texts. The texts of archive L.2712⁴¹ register rations (given to the king, the queen, the court) of food, wheat, barley, bread, oil, objects of wood, some silver, gold (one text) for a period of around three years. No rations of wool are referred to in these texts. It is evident that at Ebla wool rations were registered in the monthly accounts of textiles.

Some (few) monthly accounts of textiles have long lists of female workers of the court, receiving wool as ration/payment for their work. Some of these women work under the direction of important women or functionaries of the court to produce textiles. There are studies of the two best examples of this type of texts: TM.75.G.1743 and TM.75.G.2443.⁴² These female workers worked in weaving houses (*'a₅-za-ru₁₂*) in which different types of textiles were woven. The word *'a₅-za-ru₁₂* is rarely documented in the Ebla texts⁴³ and it is not possible to know where they were located and how many weaving houses there were in Ebla. Archaeologically it is very difficult to identify weaving houses as recently demonstrated by C. Breniquet.⁴⁴ From the Ebla texts it is not possible to know how the weaving houses operated or the working conditions and lives of woman and children working there; so it is impossible to verify if conditions of work were as hard as in the weaving houses of the Ur III period when hundreds of women and children worked in conditions of slavery.⁴⁵

From all the textile texts it is evident that the most common wool rations for female workers were: one measure-na₄ of wool, two measures-na₄ (=1 'KIN') of wool; two 'KIN'-measures of wool were given as rations/payment to some important ladies. In some rare cases also 3 'KIN' measures were given.

Some examples:

MAT 75.G.1225 (king Išar-damu, vizier Ibbi-zikir, month *za-lul*), after the registration of textiles to the king of Uzamu and members of his court in obv. XI 3–11: 25 'KIN' siki 10 dam 2 na₄ siki 30 dam 1 na₄ siki ir₁₁-sù 1 gu-dùl-TÚG 1 sal-TÚG 1 íb + IV-TÚG-gùñ Ìr-NI-ba 4 'KIN' siki 1 dam 2 na₄ siki 6 dumu-nita-sù 1 na₄ siki. This passage demonstrates what C. Zaccagnini already discovered many years ago, that 1 'KIN' = 2 na₄ of wool; the sum of 25 'KIN' of wool is the total of 10 'KIN' given to 10 women receiving each 2 na₄ (=1 'KIN') and 15 'KIN' given to 30 women, receiving each 1 na₄; then a woman receives 2 measures-na₄ (=1 'KIN') and 3 'KIN' are divided amongst 6 children (working with them), each-receiving 1 measure-na₄.

TM.75.G.2439+ (king Išar-damu, vizier Ibbi-zikir first three years, month lost) rev. XII 2–6: 1 *mi-at* 52 'KIN' siki gi₆ babbar 1 *mi-at* 46 géme 6 a-am mu₄-mu é *I-bí-zi-kir*; each servant and worker-a-am is receiving 1 'KIN' of wool.

In the same text after the textiles destined for-the king of Gudadalum, his women, his sons are registered in obv. VII 11–12: 10 lá-2 'KIN' siki 10 lá-2 géme-sù '8 measures-'KIN' of wool destined to 8 servants of the king; 1 'KIN'-measure of wool

to each servant. In the same text in rev. XIII 3'-6': x 'KIN' si[k_i] 10 dam 2 na₄ siki 41 dam 1 na₄ siki 'À-ma-du-gú^{ki}; 51 women receive wool in Amadugu, possibly a village of the Ebla *chora*, one of the many toponyms not quoted in the repertoires of Eblaite toponyms.⁴⁶

TM.75.G.2419 + 11653 (king Išar-damu, vizier Ibbi-zikir last years, month lost) rev. XIII 1-17: 3 'KIN' siki *ni-za-ù Da-kum-da-mu* 14 'KIN' siki *ni-za-ù* 7 dam *I-bí-zi-kir* 8 'KIN' siki *ni-za-ù* 4 dam BAD-É 24 'KIN' siki gi₆ 12 dam mah 1 *mi-at* 35 'KIN' siki gi₆ babbar 1 *mi-at* 35 dam 6 'KIN' siki gi₆ babbar 6 a-am mu₄-mu é *I-bí-zi-kir*.

As usual some more important women receive 2 measures-'KIN' and other women receive only 1 'KIN' of wool.

It is possible to conclude that rations of wool (1 na₄, 2 na₄, 2 'KIN') were given regularly only to women and female workers. The frequency of the rations is difficult to determine.

Occasional deliveries of wool on particular occasions are registered in several texts.

For example: TM.75.G.2573 (king Išar-damu, vizier Ibbi-zikir, month lost) obv. V 1-7: 3 'KIN' siki gi₆ *En-zi-ma-lik* dumu-nita *Ì-lum-bala* du-du *si-in Du-gú-ra-su^{ki}*; 3 measures-'KIN' of wool are given to Enzimalik son of Ilumbala, on occasion of his (long) trip to Dugurasu, i.e. to the Delta of Egypt.⁴⁷

TM.75.G.1442 (king Išar-damu, vizier Ibbi-zikir, month *ig-za*) rev. XI 5-13: 3 *mi* 'KIN' siki *Ù-ba-an* 40 'KIN' siki NI-a-la-bù 40 'KIN' siki *Íl-zi* 20 'KIN' siki *Mi-ga-ì* lú Sum^{ki}; Eblaite functionaries receive conspicuous quantities of wool possibly to pay workers.

TM.75.G.1330 (king Išar-damu, vizier Ibbi-zikir first year, month lost) rev. VII 8-VI 1: 1 *mi-at* 'KIN' siki *Za-gú-rúm* lú ama-gal en in 'À-ma-du^{ki} šu ba₄-ti ;

rev. VIII 1-6: 3 'KIN' siki *In-gâr* lú *Ib-rí-um* in 'À-ma-du^{ki} šu ba₄-ti

TM.75.G.1938 rev. XIII 14'-17': 4 'KIN' siki 4 dam *ra-zi-ma-tum al₆* ÉxPAP *Ìr-kab-da-mu* '4 measures-'KIN' of wool to 4 women who are weeping at the tomb of Irkab-damu'; these are measures of wool given as payment to the women who are weeping at the tomb of the king that just died.

Some texts register payment with quantities of wool given for reapers who work in the fields of the palace, reaping barley.

In TM.75.G.1772 (king Išar-damu, beginning of vizier Ibrium, month lost), carpenters and smiths working at the temple of god Adad of Aleppo receive quantities of wool as payment for their work. It is more probable that wool was given as payment to workers and not to be used in the works of the temple.⁴⁸

Several texts quote the annual purification of the palace of the king; the priest of the temple of Kura who performed the purification⁴⁹ receives textiles and a quantity of wool in exchange of his service.

It is possible to conclude that the wool was occasionally given as ration/payment for services to several categories of functionaries and workers of the palace. Female workers received rations of wool for different kinds of work at the court. It is not possible so far to know the frequency of the rations; more texts must be studied in the relative chronology, year by year and month by month.

From texts of Mesopotamia and particularly from those of the III Dynasty of Ur

(2100–2000 BC) it is evident that rations of wool were annual and they consisted in 4 minas of wool for a man, 3 minas for a woman and 2 minas for a child.⁵⁰

*

In the city of Ebla, the most important use of wool was to make fabrics. The palace of Ebla frequently used wool also as payment for services for its functionaries and workers and to purchase goods. In particular, female workers living at the court probably received regular rations of wool from the palace. The consistency and the frequency of wool rations distributed by the royal palace of Ebla have yet to be studied; this study can only be completed when all of the monthly accounts of textiles of the large archive L.2769 are arranged in relative chronology, year by year and month by month.

Abbreviations

ARE Archivi Reali di Ebla.
 ARE^S Archivi Reali di Ebla.Studi
 ME^S Materiali Epigrafici di Ebla
 MA^S Monthly Account of Textiles

Bibliography

- Alberti, M. E., Ascalone, E. and Peyronel, L. (2006), *Weight in Context. Studi e materiali* 13. Roma.
- Andersson Strand, E. (2010) The Basics of Textile Tools and Textile Terminology: From Fibre to Fabric. In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean From the Third to the First Millennia BC*, 10–22. Ancient Textiles 8, Oxford.
- Archi, A. (1980) Allevamento e distribuzione del bestiame ad Ebla. *Annali di Ebla* I, 1–33.
- Archi, A. (2005) The Business of Mr Iram-malik. In L. Kogan, N. Koslova, S. Loesov and S. Tishchenko (eds), *Memoriae Igor M. Diakonof. Babel und Bibel* 2, 9–19. Winona Lake.
- Ben-David, A. (1979) The Philistine Talent from Ashdod, the Ugarit Talent from Ras Shamra, the ‘Pym’ and the ‘Nīp’. *Ugarit Forschungen* 11, 29–45.
- Biga, M. G. (1988) Frauen in der Wirtschaft von Ebla. In H. Waetzoldt and H. Hauptmann (eds), *Wirtschaft und Gesellschaft von Ebla*, 159–171. Heidelberg.
- Biga, M. G. (2002) Les foires d’après les textes d’Ebla. *Florilegium Marianum* VI. *Mémoires de NABU* 7, 277–288. Paris.
- Biga, M. G. (2003a) Aspetti monetari e finanziari dell’area siro-palestinese nel III e II millennio a.C. In Istituto Italiano di Numismatica, *Per una storia del denaro nel Vicino Oriente antico. Studi e materiali* 10, 59–78. Roma.
- Biga, M. G. (2003b) Feste e fiere a Ebla. In C. Zaccagnini (ed.), *Mercanti e politica nel mondo antico. Saggi di Storia antica* 21, 55–68. Roma.
- Biga, M. G. (2003c) The Reconstruction of a Relative Chronology for the Ebla Texts. *Orientalia* 72, 345–367.
- Biga, M. G. (2006a) Some Thoughts on Fairs, Temples and Weights. In M. E. Alberti, E. Ascalone and L. Peyronel (eds), *Weight in Context. Studi e Materiali* 13, 341–345. Roma.
- Biga, M. G. (2006b) Operatori culturali a Ebla. In M. Rocchi, P. Xella and J. A. Zamora (eds), *Gli operatori culturali. Studi Epigrafici e Linguistici* 23, 17–37. Verona.
- Biga, M. G. (2009) ARET I 3 + ARET XII 146, ARET I 7 + ARET XII 934 and Other Recent Joins of the Ebla Monthly Accounts of Textiles. *NABU* 2009/29, 37–40.
- Biga, M. G. (2010a) War and Peace in the Kingdom of Ebla (XXIV Century BC) in the First Years of Vizier Ibī-zikir Under the Reign of the Last King Išar-damu. *Quaderni di Vicino Oriente* V, 25–40.
- Biga, M. G. (2010b) Textiles in the Administrative Texts of the Royal Archives of Ebla (Syria, XXIV Century BC) with Particular Emphasis on Coloured Textiles. In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean From the Third to the First Millennia BC*, 146–172. Ancient Textiles 8, Oxford.

- Biga, M. G. (2010c) More on Relations between Ebla and Harran at the Time of the Eblaite Royal Archives (24 Century BC). In S. Donmez (ed.), *Veysel Donbaz'a Sumulan Yazilar DUB.SAR É.DUB.BA.A Studies presented in Honour of Veysel Donbaz*, 159–165. Istanbul.
- Biga, M. G. (2010d) ARET III 692 + ARET XII 699 and Other New Joins of the Ebla Tablets. *NABU* 2010/23, 32.
- Biga, M. G. (2011) La lana nei testi degli Archivi Reali di Ebla (Syria, XXIV sec. a.C.): alcune osservazioni. In E. Ascalone and L. Peyronel (eds), *Studi italiani di metrologia ed economia del Vicino Oriente antico. Studia Asiana* 7, 77–92.
- Biga, M. G. (2013) Defining the *Chora* of Ebla. A Textual Perspective. In P. Matthiae and N. Marchetti (eds), *Ebla and Its Landscape. Early State Formation in the Ancient Near East*, 259–267. Walnut Creek.
- Biga, M. G. (2014) Inherited Space: Third Millennium Political and Cultural Landscape. In E. Cancik-Kirschbaum, N. Brisch and J. Eidem (eds), *Constituent, Confederate, and Conquered Space in Upper Mesopotamia: The emergence of the Mitanni state*, 93–110. Berlin.
- Biga, M. G. (in press) Bitumen at Ebla.
- Biga, M. G. and Pomponio, F. (1990) Elements for a Chronological Division of the Administrative Documentation of Ebla. *JCS* 42/2, 179–201.
- Biga, M. G. and Roccati, A. (2012) Tra Egitto et Sirie nel III millennio a.C. In *Atti dell'Accademia delle Scienze di Torino, Classe Scienze morali* 146, 17–42. Torino.
- Bonechi, M. (1989) Un atto di culto a Ebla. *Miscellanea Eblaitica* 2, *Quaderni di Semitistica* 16, 131–147. Firenze.
- Bonechi, M. (1993) *Il nomi geografici dei testi di Ebla. Répertoire Géographique des Textes Cunéiformes* 12/1. Wiesbaden.
- Bonechi, M. (1999) Studies on the Architectonic and Topographic Terms in the Ebla Texts, I, *Die Welt des Oriens* 30, 21–34.
- Breniquet, C. (2008) *Essai sur le tissage en Mésopotamie, des premières communautés sédentaires au milieu du IIIe millénaire avant J.-C.*, Paris.
- Breniquet, C. (2010) Weaving in Mesopotamia During the Bronze Age: Archaeology, Techniques, Iconography. In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean From the Third to the First Millennia BC*, 52–67. Ancient Textiles 8, Oxford.
- Cancik-Kirschbaum, E. (1999) *lúšāpi'u/sēpū*. Eine akkadische Berufsbezeichnung aus dem Bereich der Textilherstellung. In B. Böch, E. Cancik-Kirschbaum and T. Richter (eds), *Munuscula Mesopotamica, Festschrift für Johannes Renger (AOAT 267)*, 79–93. Münster.
- Conti, G. (1997) Carri ed equipaggi nei testi di Ebla. *Miscellanea Eblaitica*, 4, *Quaderni di Semitistica* 19, 23–71. Firenze.
- Cooper, J. (1986) *Presargonic Inscriptions, The American Oriental Society. Translations Series. Volume I*. New Haven.
- Firth, R. and Nosch, M.-L. (2012) Spinning and Weaving Wool in Ur III Administrative Texts. *JCS* 64, 65–82.
- Liverani, M. (1972) Il talento di Ashdod: *Oriens Antiquus* 11, 196–197.
- Marchesi, G. (2013) Of Plants and Trees. Crops and Vegetable Resources at Ebla. In P. Matthiae and N. Marchetti (eds), *Ebla and Its Landscape. Early State Formation in the Ancient Near East*, 274–293. Walnut Creek.
- Michailidou, A. (2008) *Weight and Value in Pre-coinage Societies Volume II. Sidelights on Measurement from the Aegean and the Orient*. Athens.
- Michel, C. and Nosch, M.-L. (2010) *Textile Terminologies in the Ancient Near East and Mediterranean From the Third to the First Millennia BC*, Ancient Textiles 8, Oxford.
- Parise, N.F. (1984) Unità ponderali e rapporti di cambio nella Siria del Nord. In A. Archi (ed.), *Circulation of Goods in non-Palatial Context in the Ancient Near East*, 125–138. Roma.
- Parise, N. F. (1986) Pesi egei per la lana. *La Parola del Passato* 227, 81–88.
- Parise, N. F. (1991) Dai pesi egei per la lana alla mina di Dudu. *Quaderni Ticinesi* 20, 13–16.
- Parise, N. F. (2001–2003) Misure siriane e misure mesopotamiche nell'Età del Bronzo. *Scienze dell'Antichità* 11, 443–445.
- Pasquali, J. (1997) La terminologia semitica dei tessili nei testi di Ebla. *Miscellanea Eblaitica*, 4 *Quaderni di Semistica* 19, 217–270. Firenze.
- Pasquali, J. (2005) Remarques comparatives sur la symbolique du vêtement à Ébla. In L. Kogan, N. Koslova, S. Loesov and S. Tishchenko (eds), *Memoriae Igor M. Diakonof Babel und Bibel* 2,

- 165–184. Winona Lake.
- Pasquali, J. (2010) Les noms sémitiques des tissus dans les textes d'Ebla. In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean From the Third to the First Millennia BC*, 173–185. Ancient Textiles 8, Oxford.
- Peyronel, L. (2004) *Gli instrumenti di tessitura dall'età del Bronzo all'epoca persiana. Materiali e studi archeologici di Ebla 4*. Roma.
- Peyronel, L. (2008) Guerre e alleanze in epoca palaeobabilonese: il peso di Inibšina, figlia di Daduša di Ešnunna. *Vicino Oriente* 14, 147–160.
- Pomponio, F. (2008) Note sui tessuti della documentazione di Ebla. Il periodo di Arrugum. In M. Perna and F. Pomponio (eds), *The Management of Agricultural Land and the Production of Textiles in the Mycenaean and Near Eastern Economics*, 101–109. Napoli.
- Pomponio, F. and Xella, P. (1997) *Les dieux d'Ebla*. Münster.
- Powell, M. (1998) Masse und Gewichte. *Reallexikon der Assyriologie* Bd 7, 457–517.
- Roccati, A. in press Dugurasu = rw-Hawt. In A. Archi, M. G. Biga and L. Verderame (eds), *Proceedings of the 57 RAI*, Rome 4–8 July 2011.
- Sallaberger, W. (2009) Von der Wollration zum Ehrenkleid Textilien als Prestigegüter am Hof von Ebla. In B. Hildebrandt and C. Veit, (eds), *Der Wert der Dinge-Güter im Prestigediskurs*, 241–278. München.
- Steinkeller, P. (1980) Matresses and Felt in Early Mesopotamia. *Oriens Antiquus* 19, 79–100.
- Verderame, L. (2008) I documenti di pesatura di tessili da Umma. In M. Perna and F. Pomponio (eds), *The Management of Agricultural Land and the Production of Textiles in the Mycenaean and Near Eastern Economics*, 111–133. Napoli.
- Waetzoldt, H. (1988) Die Situation der Frauen und Kinder anhand ihrer Einkommenverhältnisse zur Zeit der III. Dynastie von Ur. *Altorientalische Forschungen* 15, 30–44.
- Waetzoldt, H. (2007) The Use of Wool for the Production of Strings, Ropes, Braided Mats, and Similar Fabrics. In C. Gillis and M.-L. B. Nosch (eds), *Ancient Textiles. Production, Craft and Society*, 112–124. Copenhagen.
- Waetzoldt, H. (2010) The Colours and Variety of Fabrics from Mesopotamia during the Ur III Period (2050 BC). In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean From the Third to the First Millennia BC*, 201–209. Ancient Textiles 8, Oxford.
- Wachter-Sarkady, C. (2013) Consuming Plants. Archaeobotanical Samples from Royal Palace G and Building P4. In P. Matthiae and N. Marchetti (eds), *Ebla and Its Landscape. Early State Formation in the Ancient Near East*, 376–403. Walnut Creek.
- Zaccagnini, C. (1984) The Terminology of Weight Measures for Wool at Ebla. In P. Fronzaroli (ed.), *Studies on the Language of Ebla. Quaderni di Semitistica* 13, 189–204.
- Zaccagnini, C. (1990) The Nuzi Wool Measures Once Again. *Orientalia* 59, 312–319.

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2 For an initial study of these archives ARES I, 285–290.

3 For different type of textiles of wool recently Biga 2010b, Pasquali 2010.

4 Linen textiles were also used at Ebla and are quoted by the texts. Paleobotanical evidence includes only a few seeds of linen, which are sufficient to show that linen was produced in Ebla too, but its production was limited. Linen textiles were delivered predominantly to the king and to important members of the court. It is evident, especially from the 'mu-DU' texts registering the goods sent to Ebla by the Eblaite 'Lords' and by foreign kingdoms, that linen textiles came to Ebla mainly from the capitals of two kingdoms, Dulu, and to a greater extent, from Dugurasu. Considering their specialized production of linen textiles and the fact that Ebla sent large amounts of lapis lazuli and tin as ceremonial gifts to Dugurasu, and only to Dugurasu, I recently proposed the identification of Dugurasu as the cuneiform writing of the Egyptian word for the Delta of Egypt. For linen and linen textiles at Ebla recently Pasquali 2010, 173; Marchesi 2013; for paleobotanical references Wachter 2013. For Dugurasu see Biga and Roccati 2012, 17–42; Roccati in press.

5 For the joins Biga 2009; Biga 2010a, c, d.

6 Biga-Pomponio 1993, 108–110; Biga 2010a, 161–162.

- 7 The c. 5 years of vizier Arrugum under the reign of king Irkab-damu are documented by the texts published by Pomponio in ARET XV/1, 2; then we can count 36 years of the reign of the last king Išar-damu with his two viziers Ibrium and Ibbi-zikir; several of the texts of this long period are published in ARET I, II, IV, VIII, MEE II, V, VII, X, XII, and a large part is still to be published.
- 8 These are the problems for the epigrapher studying wool in the textiles texts of Ebla.
- 9 For a recent general view on uses of wool at Ebla Biga 2011.
- 10 For this text already Zaccagnini 1984, 191–198.
- 11 Archi 1980.
- 12 Sallaberger in this volume.
- 13 In this volume Rast-Eicher; Vila and Helmer; Andersson Strand.
- 14 Archi 2005, 9–19.
- 15 ARET XIII, 166–167 and 175–176.
- 16 For some already published ‘mu-DU’ texts MEE II, 1 e MEE XII, 3. In the ‘mu-DU’ text of the first years, quite probably of the third year of Ibbi-zikir as vizier, TM.75.G.2519+ rev. VII 1–6: 1 *mi-at* 85 na₄ siki *Ma-^{ba}* níg-ba en *Šu-ga-du* sagi šu mu-tak₄; 185 measures-na₄ of wool of Mari are given to the king by the steward (of Mari) Šugadu. After the gifts for the king, the gifts for the queen are registered, but unfortunately the tablet is broken and it is impossible to know if there were quantities of wool as gift for the queen too, even if it were probable.
- 17 Breniquet 2008, 274–278.
- 18 For weights in the Near East Alberti *et al.* 2006; for the stone weight of Dudu and other weights for wool Cooper 1986, 68; Powell 1989, 508. For measures for wool in the Near East and Mediterranean and Aegean world Zaccagnini 1990, 312–319; Parise 1986, 81–88; Parise 1991: 13–16; Parise 2001–2003: 444; Liverani 1972, 193–197; Ben-David 1979, 30–31; Peyronel 2008, 147–160; Verderame 2008, 111–133. For a detailed recent analysis of different weight measures for wool used in the Near East and their comparison with Aegean and Greek measures Michailidou 2008, 179–186.
- 19 Zaccagnini 1984.
- 20 Zaccagnini 1984; also Pasquali 1997, 223 n.32 with bibliography.
- 21 ARET XI, 5, 27–28, 55. It is impossible not to be reminded of the famous English nursery rhyme from the 18th century: ‘Bah, bah black sheep, have you any wool? Yes sir, yes sir, three bags full!’
- 22 For types of wool Breniquet 2008, 90–97; Andersson Strand 2010, 10–12; Andersson Strand and Vila and Helmer in this volume.
- 23 For different types of wool Pasquali 1997, 220–223, 236; Pomponio 2008, 109. Also ARET XII s.v. siki, 577–579; ARET XV/2, s.v. siki.
- 24 For dyed wool Breniquet 2008, 126–129; Waetzoldt 2010, 201–203.
- 25 For the different uses of wool at Ebla recently Biga 2011, 81–89.
- 26 For the most frequently quoted textiles in Sumerian and Semitic texts Pasquali 2005; Pomponio 2008; Biga 2010b; Pasquali 2010.
- 27 Several examples of this fact have been already published; also TM.75.G.1319 (king Išar-damu, vizier Ibrium, possibly an account of several months) rev. V 11–18: 3 *gu-zi-tum* TAR TAR *Ku-bar-ru*₁₂ *Kum-zé* *Ar-si-aš* *Ib-du-a-gú* *Sar-da-du* NE.DI; three guzium-textiles are cut and given to 5 dancers.
- 28 For the weight of textiles in texts of Ur III period recently Verderame 2008; Waetzoldt 2010; Firth and Nosch 2012, 65–82.
- 29 Zaccagnini 1984, 192. For the translation ‘felt’ of the word *túg-du*₈ Steinkeller 1980, 79–100; also Cancik-Kirschbaum 1999, 3–84 and n. 22 with bibliography; Waetzoldt 2007, 112–124.
- 30 Felts quoted in this text weight as usual two ‘KIN’ -measures of wool; the bands níg-lá-gaba each require 1 na₄-measure of wool.
- 31 The standard felt weighing two ‘KIN’-measures of wool are distributed to functionaries in charge of groups of 20 people, workers and possibly also soldiers, each receiving one felt. It is part of the equipment of soldiers of Ebla guided by some functionaries and other groups of soldiers provided by villages and small town of the Ebla region.
- 32 People in charge of equipment of chariots of the royal family and of members of the court have been studied prosopographically by Biga and Pomponio 1990, 199–201; the study of these functionaries was important for establishing the relative chronology of the Ebla texts.
- 33 Conti 1997, 23–71.
- 34 For offerings to deities and temples s. Pomponio and Xella 1997; s. also recently Biga 2011, 83.
- 35 Pasquali 2005, 165–184; Biga 2010b, 168–169; Pasquali 2010, 175–180.
- 36 For the identification of the word LAM₇ : KI as ‘market’ s. Conti 1997, 59–60.
- 37 For fairs at Ebla Biga 2002, 477–488; Biga 2003a, 59–78; Biga 2003b, 55–68; Biga 2006a, 341–345.
- 38 For a translation of the word ‘im-gi₆’ = lit. ‘black clay’ as ‘bitumen’ Biga in press.
- 39 For the reconstruction of relative chronology of the Ebla texts Biga 2003c, 345–367. For the texts of

the first three years of vizier Ib-bi-zikir Biga 2010a.

40 For deliveries of wool to women of the Eblaite court Biga 2011, 86–89.

41 Some of the texts have been published by L. Milano in ARET IX and the others will be published by Archi and myself in the volume ARET X.

42 Biga 1988, 159–171.

43 Bonechi 1999, 21–27.

44 Breniquet 2008, 38–42, 213–219; Breniquet 2010.

45 For weaving houses Waetzoldt 1988, 30–44; Firth and Nosch 2012, 65–82.

46 The two lists of Ebla toponyms are ARES II and Bonechi 1993; for villages and cities of the Ebla chora Biga 2013.

47 For the proposition that Dugurasu should be identified as the cuneiform writing of the Egyptian word for Delta of the Nile s. Biga and Roccati 2012; Roccati in press.

48 TM.75.G.1772 v. VI 3–14: 7 ‘KIN’ siki nagar-nagar kin₅-ak é d’À-da lú *Ĥa-lab_x*^{kl} (anep.) [x] ‘KIN’ siki simug -simug kin₅-ak é d’À-da, ‘7 measures-’KIN’ of wool to carpenters who are working in the temple of Adad of Aleppo, [x] measures-’KIN’ of wool to smiths who are working in the temple of Adad’.

49 For this ritual Bonechi 1989, 131–147; Biga 2006b, 26; Biga 2011, 89.

50 Waetzoldt 1987, 117–141; Breniquet 2008, 208–213; Sallaberger 2009, 243–244.

10. Making Textiles at Arslantepe, Turkey, in the 4th and 3rd Millennia BC. Archaeological Data and Experimental Archaeology

Romina Laurito, Cristina Lemorini and Assunta Perilli

This paper presents an overview of textile production at Arslantepe between the 4th millennium BC and the beginning of the 3rd millennium BC through the technological analyses of textile tools and the study of their archaeological contexts. It is the result of joint research since 2006 involving the Italian Archaeological Mission at Arslantepe and the Danish National Research Foundation's Centre for Textile Research (henceforth referred to as CTR) of the University of Copenhagen in a European Research Program *Tools and Textiles – Texts and Contexts* on textile tools and textile production in the Mediterranean Basin. Arslantepe is, up to now, the most ancient and eastern site of this European Research Program.¹

In 2012 the authors started an experimental program focusing on the investigation of the technical peculiarities of Arslantepe textile tools. We first decided to concentrate on the production and use of replicas of spindle whorls, the most represented category of textile tools at Arslantepe. A. Perilli, who is an expert artisan of Italian traditional textiles, worked with replicas of archaeological spinning tools coming from different periods of the Arslantepe sequence and used them for spinning both wool and plant fibres.

The preliminary experimental results suggest new clues for the interpretation of textile activities at Arslantepe.

The mound of Arslantepe occupies an area of about 4.5 ha, with a 30 m thick deposit and has an oval shape measuring 250 × 180 m along the NE-SW and the NW-SE axes respectively.² The mound is 912 metres above sea level, in the Malatya plain, on the western margin of the Eastern Anatolian region, between the eastern part of the Taurus chain and the Anti-Taurus (Fig. 10.1). The Taurus Mountains are marked by the presence of high peaks creating a natural barrier between the Syro-Mesopotamian plain and the Anatolian lands.

Arslantepe lies in an area rich in water resources. The site is located at about 12 km south of the Euphrates. The Euphrates links this area to Syria and Mesopotamia and also divides Malatya's plain from the eastern territories: the Elazığ plain and the now submerged Altınova plain.³ Because of this geographical position, Arslantepe is the largest and most important site of the Malatya-Elazığ area and,

although small in size in comparison with Syro-Mesopotamian settlements, it was always the dominant centre in its region.⁴

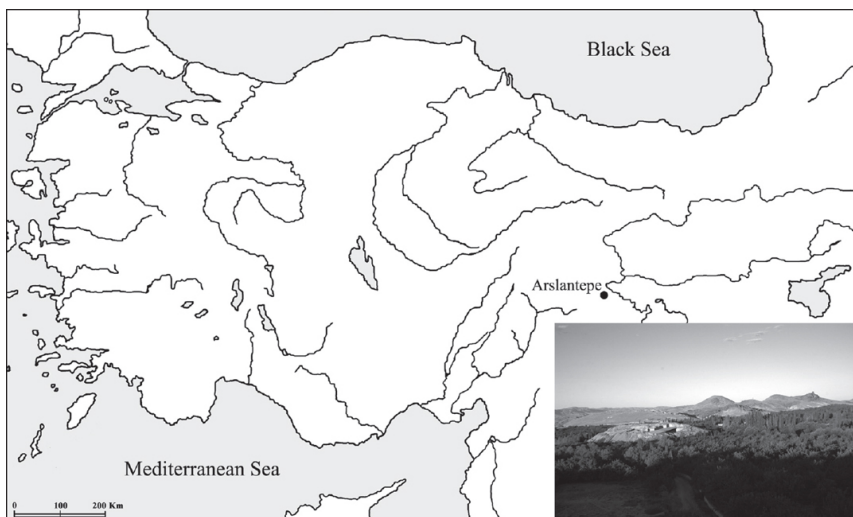


Fig. 10.1. Localisation of the mound of Arslantepe in Eastern Anatolia.

The site has been excavated by an Italian Expedition since the beginning of the 1960s and until now remains the only site of the Upper Euphrates area that has been investigated over a long term. The continuity of the Arslantepe investigations has allowed a reconstruction of its uninterrupted stratigraphic sequence that has become a reference frame for scholars involved in research on the early formation of centralised states and societies. The formation of the site seems to be characterized by prehistoric levels which had its highest point in the south-western area, while the core of the historical settlement was formed by a series of important structures centred on the northern sector.⁵

The systematic excavations and the scrupulous analysis and methodologies of research related to both field investigations and material collection and recording, allow us to reconstruct a detailed sequence of the history of the settlement, defining an occupational sequence of the site from the end of the 5th millennium to the Byzantine period.⁶ The topic of this analysis concerns the widely investigated Arslantepe periods VII to VI B2 (Table 10.1), respectively corresponding in the Northern Mesopotamian chronology⁷ to Late Chalcolithic 3–4 (3800–3350 BC), Late Chalcolithic 5 (3350–3000 BC) and Early Bronze Age I (3000–2750 BC).

Chronological sequence	Arslantepe periodization	Dendrochronology with calibrated ¹⁴ C determinations	Contemporaneous cultures in Near Eastern
Late Roman and Byzantine Age	I		
Iron Age	II–III	1100–700 BC	Neo-Hittite period
Late Bronze Age II	IV	1600–1200 BC	Middle Hittite Kingdom and Hittite Empire
Late Bronze Age I	V B	1750–1600 BC	Early Hittite Kingdom
Middle Bronze Age	V A	2000–1750 BC	Paleo-Assyrian colonies in Anatolia
Ancient Bronze Age III	VI D2–3 VI D1	2400–2000 BC 2500–2400 BC	Early Dynastic IIIb, Akkad, Ur III in Mesopotamia
Ancient Bronze Age II	VI C	2750–2500 BC	Early Dynastic II–IIIa in Mesopotamia
Ancient Bronze Age I	VI B2* VI B1	2900–2750 BC 3000–2900 BC	Jemdet Nasr period, Early Dynastic I in Mesopotamia
Late Chalcolithic 5	VI A	3350–3000 BC	Late Uruk period in Mesopotamia
Late Chalcolithic 3–4	VII	3800–3350 BC	Early to Middle Uruk period in Mesopotamia
Late Chalcolithic 1–2	VIII	4250–3800 BC	Post Ubaid culture in Mesopotamia

Table 10.1. Arslantepe. Chronological sequence.

**The sub-phase VI B3 (Early Bronze I final, 2800–2750 BC) has been recently added. See Frangipane 2012, tables 1 and 253.*

1. Spinning and weaving at Arslantepe: archaeological data

One hundred and fifty-two textile toolss were recorded at Arslantepe from period VII to period VI B2 (Table 10.2). In total, more than 280 objects related to spinning and weaving activities have been recovered if the textile tools from the following periods (Early Bronze Age II and III and Middle Bronze Age) are added.

In general, Arslantepe does not have a large number of textile tools. It might sound strange especially if we consider that spinning and weaving were among the most important and intensive daily activities throughout antiquity. We must keep in mind the possibility that many textile tools could have been made of perishable raw materials, such as wood.⁹ Spinning tools are the prevailing textile tools found at Arslantepe. The major group of textile tools is from Arslantepe VII.

During period VII (Late Chalcolithic 3–4, 3800–3350 BC), the settlement of Arslantepe covered the whole area of the mound, showing a clear differentiation between functional and symbolic areas. On the North-Eastern edge of the site, common mud-brick houses, with evidence of domestic activities, have been brought to light. Monumental buildings had been built in the central-western area. These are larger in size with thick walls, a main hall decorated with paintings and mud-brick columns. The individual rooms and the floor plans have been modified over time, whilst maintaining a monumental character. These did not have any evidence of public features and were more likely to have been the residences of the elite. A large isolated ceremonial building (Temple C) was built next to the elite residences; and to the North-East of it, a series of long rooms with thick walls might have been linked to the temple and had been used as craft workshops.

			VII				VI A				VI B1			VI B2		Total
			Workshop	Houses	Pits	Filling layers	Palace area	Houses	Pits	Filling layers	Houses	Pits	Filling layers	Houses	Pits	
Spindle whorls	bone	convex	2	10		6	2	2			1			3		26
		conical		4	2	4				1			1			12
		biconical		1										1		2
	clay	convex				1										1
		conical		1		1				1						3
		biconical		1							2			2	2	7
	stone	convex												1	1	2
		conical												2		2
		discoid		3	2	3	1									9
		spherical				1										1
	pottery	cylindrical						1								1
		rounded sherds		9		3					4	4		4	3	27
Loom weights		unfired clay	hemispherical		18											18
	not identifiable			5											5	
	fired clay	conical						17								17
		discoid elliptical						1								1
		spherical ovoid						1			2			1	4	
Other tools		comb						1								1
		shuttle ?						1		1						2
		pin beater/ beater							3				1			4
		needle		1	2					1				1		5
		spool		1			1									2
Total			2	54	7	18	4	23	4	4	5	8	2	14	7	152

Table 10.2. Arslantepe. Chronological distribution and finding contexts of textile tools. Even pierced rounded sherds are here considered although their function as textile tools (spindle whorls or weights?) is actually only hypothesized (Andersson and Nosch 2007). Note: Textile tools recorded until the campaign 2008.

During Arslantepe VII, all textile tools were from residential buildings (Fig. 10.2). In particular, 12 spindle whorls and pierced rounded sherds came from the elite residential building. No loom weights have been found there. Some spindle whorls have been also discovered in the small private dwellings, at the north-eastern periphery of the period VII settlement.

By contrast, no remains of textile tools were unearthed in the area of the huge public ceremonial building, Temple C, and only two spindle whorls came from the workshop areas connected to this building.

Spindle whorls are the most significant finds in period VII (Fig. 10.3 a–h). They are principally made of bone from the head of the femur of adult cows¹⁰. Relatively few spindle whorls are made from stone or clay.

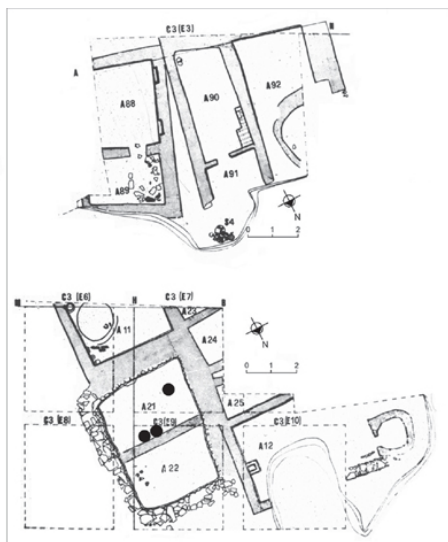
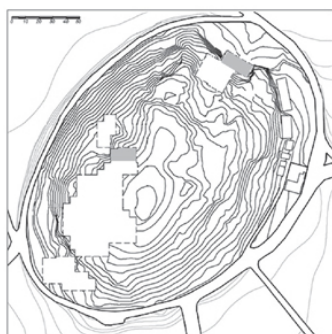
An assemblage of 23 loom weights (Fig. 10.3 i–l) testifies weaving activities and the use of the warp-weighted loom¹¹ at Arslantepe VII. They have been found *in situ* in a household context (room A923) located to the west of the elite building. The weights are made of unfired clay and have a quite hemispherical shape. The range of their weights and thicknesses are very wide (weight: 492–870 g; thickness: 77–101 mm).

According to the principles established by CTR, weight and thickness of the loom weights are the two functional parameters which play an important role when weaving; hence the choice of loom weights affects the fabric produced.¹² So, weight and maximum thickness of loom weights, combined with the results of the CTR experimental weaving experiments, make it possible to determine the likely types of fabric that could be produced with a given yarn quality. The possible loom setups for the Arslantepe VII looms weights have been calculated, giving information about the fabrics produced with these tools. The calculations demonstrate that a fabric produced with these loom weights would have had

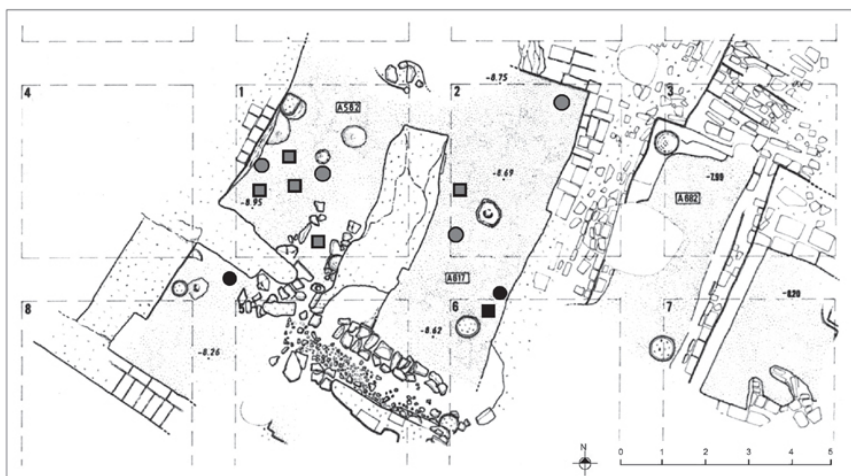
approximately 6 threads per cm in the warp.¹³

Few textile tools have been discovered for Arslantepe VI A (Late Chalcolithic 5, 3350–3000 BC), a level contemporary with the developments of the Late Uruk culture in Mesopotamia, and the Uruk ‘colonisation’ in the Syro-Anatolian regions. During this period, the public area of Arslantepe underwent large-scale development, in terms of both its extent and the concentration of activities. The area used for public activities became a cluster of interconnected buildings and sectors, differing in shape and function: ceremonial buildings (Temples A and B), official buildings, prestigious residential units, storerooms, courtyards, open spaces, the access corridor with painted walls, and a monumental gate entrance. In this sense this articulated complex could be defined as a ‘palace’ hosting multiple public activities, both economic and administrative (Fig. 10.4).¹⁴

Only a small number of textile tools have come from this public palatial complex. Three spindle whorls (Fig. 10.5 a–b) were found in one of the side rooms of Temple A. But the other numerous findings in this room show that the final use of this building included various activities of daily life.



a



b

Fig. 10.2. Distribution of textile tools in Arslantepe period VII. a: private dwellings in the north-eastern periphery of the mound; b: the elite residential building in the south-western part of the settlement. ● spindle whorl found on the floor; ◐ spindle whorl from the filling layers; ■ pierced rounded sherds found on the floor; ◼ pierced rounded sherds from the filling layers.

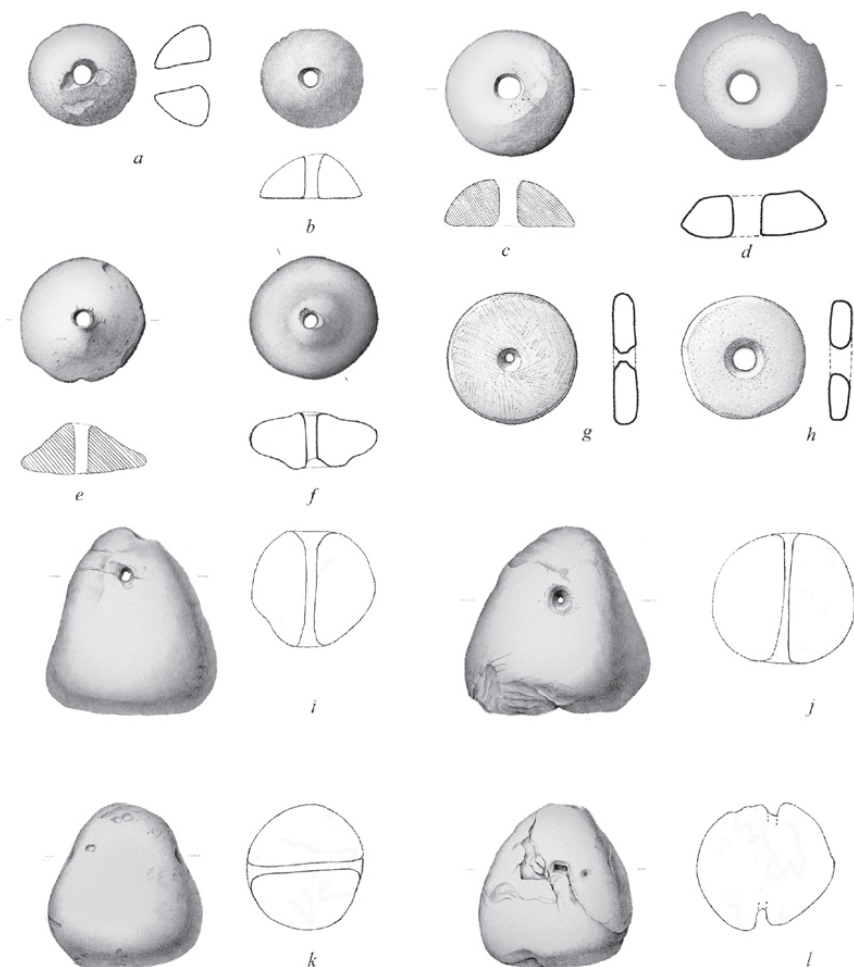


Fig. 10.3. Spinning and weaving tools from Arslantepe VII. a-c: convex spindle whorls in bone; d: conical spindle whorl in bone; e: conical spindle whorl in clay; f: biconical spindle whorl in clay; g-h: discoid spindle whorls in stone; i-l: hemispherical loom weights from A923. a-h: scale 1:2; i-l: scale 1:3. (Archivio Missione Archeologica Italiana in Anatolia Orientale)



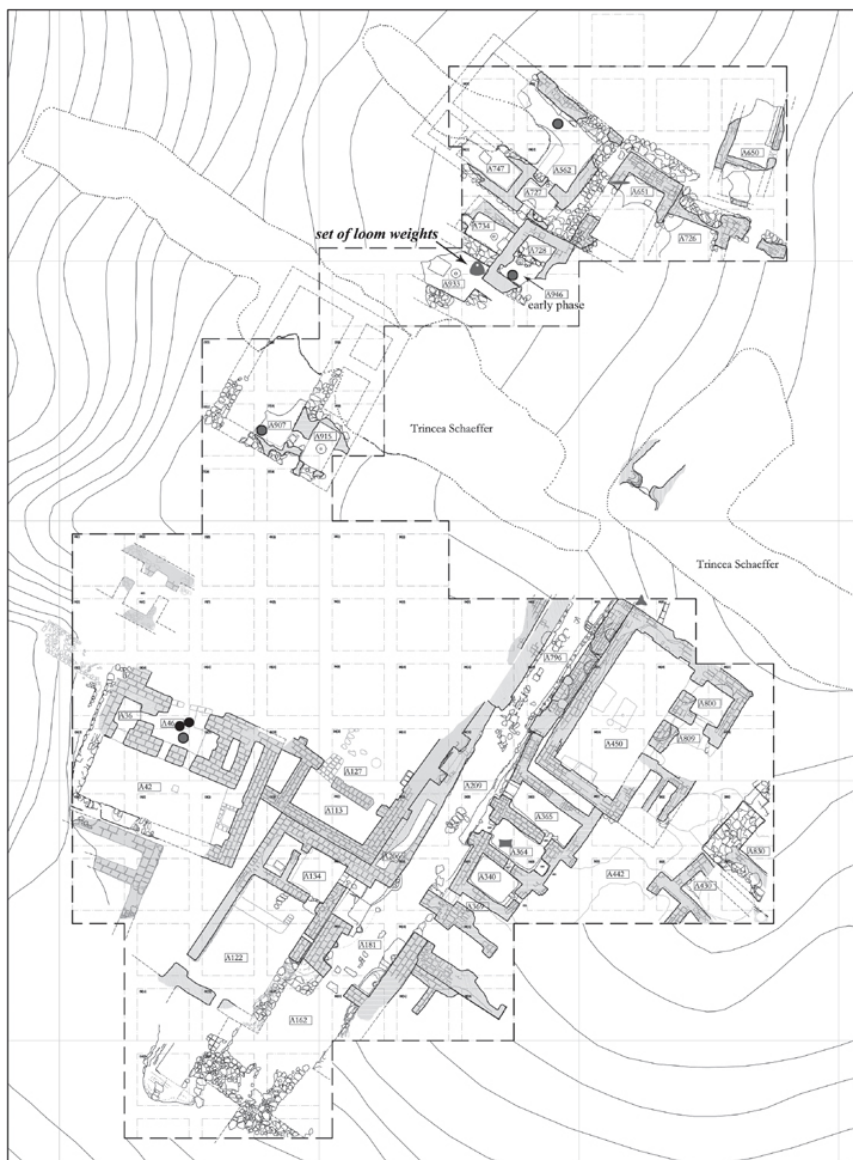


Fig. 10.4. Plan of Arslantepe VI A with textile tools distribution. ● spindle whorl found on the floor; ● spindle whorl from the filling layers; ● loom weight; ▲ spool; — shuttle; ▲ comb. In grey, tools from the filling layers.

The majority of textile tools, such as loom weights, spindle whorls and bone needles, come from the residential buildings located to the north of the 'palace', probably belonging to preeminent families. In one of these rooms (A933), almost certainly used for daily domestic activities, a set of 18 loom weights was found.

These are made of fired clay and 17 of them have a standardised conical shape (Fig. 10.5 c) with dimensions concentrated within a small range (weight: 624–828 g; thickness: 77–95 mm). The 17 loom weights were grouped together and were probably used in the same loom setup.

Based on CTR calculations a medium-sized loom weight from Arslantepe VI A works very well with a warp tension of 30 g. With 18 such loom weights – 9 weights in the front layer and 9 weights in the back layer – a weaver would have as a result an open fabric with a starting border width about 75 cm and the spacing would be 6 warp threads per cm.¹⁵

Only one loom weight was found on the floor of room A933. It is different from the other weights, with a discoid elliptical shape and is both lighter and thinner. In this case the calculations demonstrate that it is more suitable for weaving a finer fabric of 6–11 threads per cm² with thinner threads.

Numerous imprints of fabric on the reverse of *cretulae* confirm the CTR calculations. Plain tabby weave imprints are visible on many *cretulae*, and the number of threads per cm varies from 8 to 12. This is consistent with the cloth fabric density computed above for the loom weight found *in situ*. Other *cretulae* have imprints from rather coarse textiles, and the quality of some of these coarse fabrics might correspond to the fabric quality estimated for the loom weights set from room A933, with a thread count of about 6 threads per cm. Textiles made with sprang technique and with knotless netting have also been recognized on imprints showing the mixed textile technology available in that period.¹⁶

The ‘palace’ was completely destroyed by a sudden and violent fire at the end of period VI A. The site was abandoned. Phase VI B1 (Early Bronze Age IA, 3000–2900 BC) consists of a sequence of seasonal occupations by groups of transhumant herders (using wattle-and-daub architecture) linked to the so-called Kuro-Araks culture.¹⁷ Only a small number of textile tools have been found in these contexts.

Immediately after this short period, textile activities are again evident for period VI B2 (Early Bronze Age IB, 2900–2750 BC) characterised by a rural village articulated along a network of roads with small houses equipped with ovens, hearths and other domestic facilities (Fig. 10.6). Various courtyards and open areas were mainly used for working. A massive mud-brick wall was built around the upper part of the mound to create a sort of fortified ‘acropolis’ on the top of the hill.¹⁸

The famous Royal Tomb dates back to the beginning of this period, that is, the time when the fortification wall was built in the upper zone, but probably before the construction of the village outside the walls.¹⁹ It is beyond the scope of this paper to give a detailed description of the rich and elaborate equipment of the lord and of the complex ritual,²⁰ however, it is important to stress the unique presence of actual textile fragments at Arslantepe. The analyses demonstrated the use of extremely fine fabric with very thin yarn made of goats’ and not sheep’s wool fibres.²¹

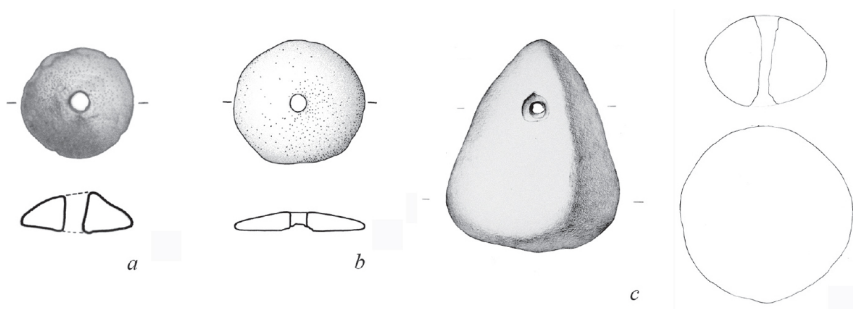


Fig. 10.5. Spinning and weaving tools from Arslantepe VI A. a: spindle whorl in clay; b: spindle whorl in stone; c: conical loom, weight from A933. a-b: scale 1:2; c: scale 1:3. (Archivio Missione Archeologica. Italiana. in Anatolia. Orientale)

Few spindle whorls have been found in the VI B2 village (Fig. 10.7 a–g), together with a huge quantity of charred seeds and many pots, stone and bone tools, suggesting that spinning was also one of the daily domestic activities in period VI B2.

Not even one loom weight for the traditional vertical warp-weighted loom has been found in the VI B2 dwellings. But, some small and light objects made in fired clay suggest the possible existence of other kinds of loom. In fact, their standardized spherical ovoid shape with one or two grooves on the surface and a diametral hole might suggest their use as weights for small portable looms (Fig. 10.7 h–j).

From period VI B2 onwards, however, a significant change in the spindle whorls can be observed (Fig. 10.8). Even if the number of objects is small, there is a remarkable difference between period VII and period VI B2 in terms of the weight and diameter of spindle whorls. The variability in size of the whorls during period VII is larger than in period VI B2 and also some spindle whorls from period VI B2 are smaller and lighter. Even the material used for making spindle whorls changed slightly. A wider use of different raw materials is observed during period VI B2, for which an equal distribution of spindle whorls made of clay, stone and bone is recorded (see Table 10.2).

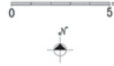


Fig. 10.6. Textile tools distribution in the rural village of period VI B2. ● spindle whorl found on the floor; ○ spindle whorl from the filling layers; ■ pierced sherds found on the floor; ▣ pierced rounded sherds from the filling layers; needle from the filling layers. The spindle whorl (symbol *) comes from A274, the reconstruction phase of A167.

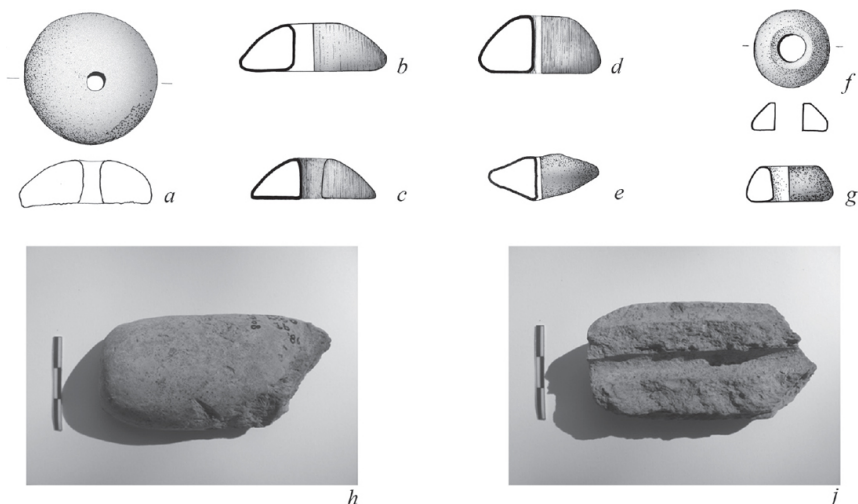


Fig. 10.7. Spindle whorls and weight (?) from Arslantepe VI B2. a–d: spindle whorls in bone; e: spindle whorl in clay, f–g: spindle whorls in stone; h–j: weight in clay. a–g: scale 1:2. (Archivio Missione Archeologica. Italiana. in Anatolia. Orientale)

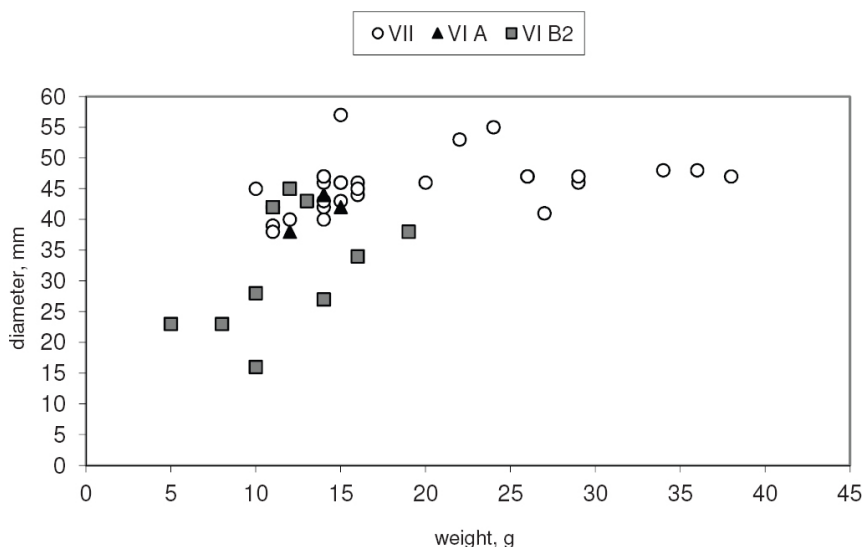


Fig. 10.8. Arslantepe. Chronological distribution of spindle whorls according to diameter and weight. (Redrawn from Laurito 2012, fig. 3).

2. Spinning at Arslantepe: experimental archaeology

The experiments conducted by CTR on spindle whorls technology were aimed to recognize the worldwide parameters which can define the quality of the thread spun. The experimental results suggest that the weight and diameter of spindle whorls are the two functional parameters which together determine the

characteristics of the fibre.²² The variety of diameter and weight shown by spindle whorls in period VI B2 suggests that, at that time, spinners of Arslantepe were able to spin different types of yarn, as well as very thin and perhaps less hard spun yarn, compared to the earlier period VII.

We decided to carry out a new series of experiments with the aim of verifying the general framework proposed by CTR with a contextualized experimental protocol. All types of spindle whorls made of bone, clay, stone, sherds from Arslantepe VII and Arslantepe VIB2 have been reproduced during a course of experimental archaeology held at Sapienza University of Rome, and devoted to the application of experimental protocols for interpreting prehistoric textile techniques.

Replicas of spindle whorls made of rounded pottery sherds, pebbles, baked clay, and bone femur of veal have been produced. For bone spindle whorls, the head of the femur of adult cattle was generally used at Arslantepe; since we have found that adult cattle currently slaughtered and marketed are bigger than their prehistoric equivalents, we decided to use heads of the femur of calves which correspond well to the dimensions and weight of the ancient tools. The shapes, dimensions and weights of replicas made of other raw materials have also been reconstructed as precise copies of the archaeological artefacts. Stone items are the only exceptions as we did not have time to find round thin pebbles exactly like the archaeological ones. Our replicas were a little bit more ellipsoidal in shape and thicker in cross-section; these differences affected our experimental results, as explained below.

It should be noted that replicas of fresh bone spindle whorls, with the same dimensions as the archaeological ones, were initially heavier (about 10–15 g more). As they dried, their weights gradually reduced and, after some months, they became the same as the corresponding archaeological items (Fig. 10.9).

During September 2012, Assunta Perilli, an expert of traditional spinning techniques of Central Italy, worked with six selected replicas made of different raw materials (Fig. 10.10 a–b). The dimensions and weight of these items fall in the same range of dimensions and weights recorded in archaeological contexts.

The participation of an artisan specialized in traditional spinning and weaving was important for the proper execution of the experiments. The skill of spinning and other such handicraft skills are acquired with time and practice. Only a spinning specialist can ‘feel’ the functional properties of different spindle whorls and adapt himself or herself to new types of tools. The same experiments made by novices would have completely invalidated the experimental results.

Spindle whorls were fixed on the bottom part of wooden rods. The choice of the bottom part instead of the centre or the top of the stick was based on the habit of our experimenter. We do not know on which part of the rod spindle whorls of Arslantepe were fixed on. As suggested by documentation on traditional practices, the choice of the position of the whorl on the rod is not related to functional differences; it is a cultural habit that could be a sign of distinction of individual, family unit or a community. It would be significant to find a way, maybe observing traces of use on the archaeological spindle whorls themselves, to recognize how spindle whorls were fixed on rods at Arslantepe.

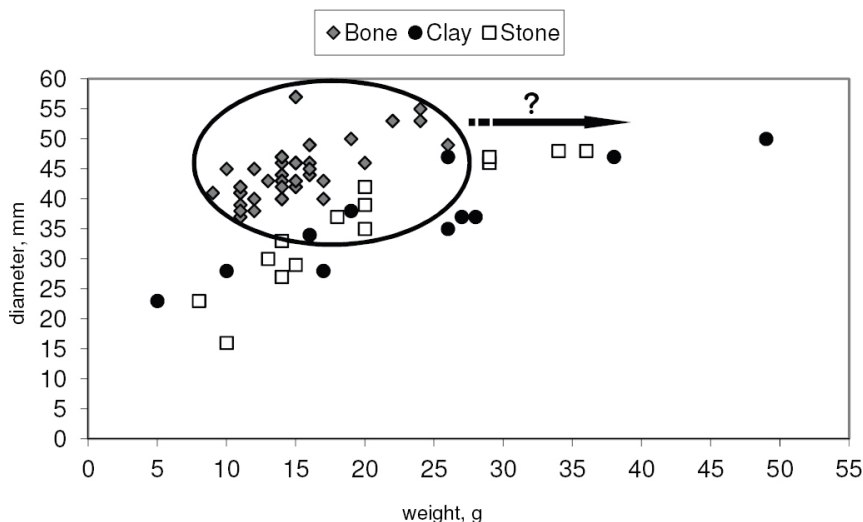


Fig. 10.9. Arslantepe. Weight and diameter of spindle whorls according to the raw material. Black circle and arrow indicate that fresh bone spindle whorls were 10–15 g heavier than the archaeological examples. (Redrawn from Frangipane et alii 2009, fig. 1).

Assunta Perilli spun both wool of Eastern Anatolian sheep and hemp (Fig. 10.10 c) fibres. Since flax was not available at the time of the experiments, we decided to process hemp due to its strong similarity with flax fibres (*relying on A. Perilli personal experience of spinning traditional plant fibres*).

We decided to use this type of sheep wool as a matter of convenience as this wool is easily available on the bazaars of the whole Eastern Anatolian region. We bought this wool in the bazaar of Malatya, a big city near Arslantepe.

Except for the stone spindle whorls, whose ellipsoidal shape made the spinning rotation difficult, the other spindle whorls worked very well. Both wool and hemp were spun with the same effectiveness in terms of quality and quantity of threads (Table 10.3).

It is worth mentioning that spindle whorls made of bone and rounded pottery sherds were the most efficient since their weight and diameter was particularly appropriate for imprinting with a single stroke several high moments of inertia thus causing a great control of the twisting of the thread. The small light baked clay spindle whorl from VIB2 needs a special mention. Its short moment of inertia requires the spinner to slightly tap in a rapid sequence the spindle whorl to prevent it stops, causing a lesser control of the twisting motion than using the heavier whorls.

In terms of spinning technology archaeological data show a greater distribution in weight and diameter of the whorls during period VII, with a clear tendency for their diameter to be generally large. A change in the size of spinning tools is clearly recognisable from period VI B2, even though the very few spindle whorls from period VI A already seem to show weights concentrated in a small range. According to the CTR experiments, the size of different whorls might reflect a shift in spinning practice and, as a result, in textile production.



Fig. 10.10. Experimental archaeology. a: Spinning with modern spindle whorls; b: Selected replica of spindle whorls from Arslantepe; c: Woollen and vegetal yarn spun using the selected replica.

	Wool gr	Wool m	Hemp gr	Hemp gr
Bone SW (33.4 gr)	8	15	6	15
Stone SW (35.7 gr)	4	5.50	8	13
Rounded sherd (25.8 gr)	10	21	12	19
Clay SW (VII) (35.6 gr)	4	7	7	15
Clay SW (VI B2) (16.2 gr)	3	6.50	-	-

Table 10.3. First results of our experimental tests.

Our own experience highlighted that wide hemispherical and heavier spindle whorls were certainly the most efficient tools in terms of quantity and quality of yarn. With these items, an experienced modern spinner may successfully spin a certain quantity of both vegetal and woollen fibres and obtain both thick and thin thread in a reasonable time. Spinning woollen fibres with a smaller and lighter clay spindle whorl was unsatisfactory because a very poor quantity of yarn has been obtained by a slow and difficult process. This kind of spindle whorl does not have sufficient moment of inertia to produce yarn starting from short fibres. Taking into account that woollen fibres at Arslantepe were probably shorter than the modern fibres²³ used for our experimentation, the difficulties should have been even greater.

We used a light wooden rod during our experiments. Nevertheless, metal rods should be expected in Arslantepe context. Using a heavier metal rod might be more suitable for maintaining the spinning motion of slight VI B2 clay spindle whorls since it would cause a higher moment of inertia.

Furthermore, as traditional spinners suggest, the processing of wool fleeces²⁴ is a crucial step for obtaining a thin and resistant yarn. It is one more variable that we have to take in account for interpreting advances in spinning activity during prehistoric times.

The main assemblages of loom weights also testify to a clear change in weaving technology over the course of time. In period VII, the weavers of Arslantepe could produce relatively coarse fabrics with 5–6 threads per cm. In period VI A, loom weights indicate the continuation of a similar production of fabric. Moreover, one lighter and thinner loom weight – if it was one of a set of weights used in a loom – from the same context demonstrates that the Arslantepe weavers could also weave a finer fabric with thinner threads. In period VI B different types of weights are attested and, if connected with weaving activity, they are not weights for a warp-weighted loom. Even if, we keep in mind that these differences between the three periods may not necessarily only represent a change over time or a change in production, but may also or only reflect the different nature of the three contexts and different types of textile production.

Textile tools from Arslantepe, in all periods (from period VII to VI B2), come exclusively from household contexts. Loom weights and spindle whorls were never found together in the same room or area in Arslantepe. Hence, spinning and weaving activities were probably carried out in different places and exclusively in household contexts alongside other domestic activities. However, the good quality of the textile tools and the variety in the textile production evident in all periods at Arslantepe, suggest a good level of spinning and weaving technologies and the presence of skilled spinners and weavers who knew how to spin and weave, and which tools to use to produce specific qualities of fabrics.

Bibliography

- Andersson Strand, E. and Nosch, M.-L. (2007) *Technical Report on Textile Tools. Arslantepe. Tools and Textiles – Texts and Contexts Research Program*. The Danish National Research Foundation's Centre for Textile Research University of Copenhagen. www.hum.ku.dk/ctr
- Barber, E. J. W. (1991) *Prehistoric Textiles. The Development of Cloth in the Neolithic and Bronze Ages with Special Reference to the Aegean*. Princeton.
- Choyke, A. M. (2000) Bronze Age Antler and Bone Manufacturing at Arslantepe (Anatolia). In M. Mashkour, A. M. Choyke and H. Buitenhuis (eds), *Archaeozoology of the Near East IVA*, 170–183. Arc Publication 32. Groningen.
- Di Nocera, G. M. (1998) *Die Siedlung der Mittelbronzezeit von Arslantepe*. Arslantepe VIII. Rome.
- Di Nocera, G. M. (2004) La misura del tempo. In M. Frangipane (ed.), *Alle origini del potere. Arslantepe, la collina dei leoni*, 18. Milan.
- Frangipane, M. (1993) Melid/Malatya. In *Reallexikon der Assyriologie und vorderasiatische Archäologie*, 42–52. Berlin.
- Frangipane, M. (1997) A 4th Millennium Temple/Palace Complex at Arslantepe-Malatya. North-South Relations and the Formation of Early State Societies in the Northern Regions of Greater Mesopotamia. *Paléorient* 23:1, 45–73.
- Frangipane, M. (ed.) (2007) *Arslantepe Cretulae. An Early Centralised Administrative System before Writing*. Arslantepe V. Rome.
- Frangipane, M. (ed.) (2010) *Economic Centralisation in Formative States. The Archaeological Reconstruction of the Economic System in 4th Millennium Arslantepe*, 275–285. Studi di Preistoria

- Oriente 3. Rome.
- Frangipane, M. (2012) The Collapse of the 4th Millennium Centralised System at Arslantepe and the Far-reaching Changes in 3rd Millennium Societies. *Origini* 34, 237–260.
- Frangipane, M., Andersson Strand, E., Laurito, R., Möller-Wiering, S., Nosch, M.-L., Rast-Eicher, A. and Wisti Lassen, A. (2009) Arslantepe, Malatya (Turkey): Textiles, Tools and Imprints of Fabrics from the 4th to the 2nd Millennium BCE. *Paléorient* 35.1, 5–29.
- Frangipane, M. and Di Nocera, G. M. (2012) Discontinuous Developments in Settlement Patterns and Socioeconomic/Political Relations on the Malatya Plain in the 4th and 3rd Millennia BC. In T. F. Borrell, G. M. Bouso, A. Gómez, Bach, C. Tornero Dacasa and O. V. Campos (eds), *Broadening Horizons 3. Conference of Young Researchers Working in the Ancient Near East*, 289–303. Bellaterra.
- Frangipane, M. and Palmieri, A. (1983) Cultural Developments at Arslantepe at the Beginning of 3rd Millennium. In M. Frangipane and A. Palmieri (eds), *Perspectives on Protourbanization in Eastern Anatolia: Arslantepe (Malatya). An Interim Report on 1975–1983 Campaigns*. *Origini* 12:2, 523–574.
- Frangipane, M. and Palumbi, G. (2007) Red-black Ware, Pastoralism, Trade, and Anatolian-Transcaucasian Interactions in the 4th-3rd Millennium BC. In B. Lyonnet (ed.), *Les cultures du Caucase (VIe–IIIe millénaires avant notre ère). Leurs relations avec le Proche-Orient*, 233–255. Paris.
- Frangipane, M., Di Nocera, G. M., Hauptmann, A., Morbidelli, P., Palmieri, A., Sadori, L., Schultz, M. and Schmidt-Schultz, T. (2001) New Symbols of a New Power in a 'Royal' Tomb from 3000 BC Arslantepe, Malatya (Turkey). *Paléorient* 27.2, 105–139.
- Hoffman, M. (1974) *The Warp-Weighted Loom*. Oslo.
- Huot, J.-L. (2000) Existe-t-il une 'révolution de la laine' au début de l'âge du Bronze oriental? In P. Matthiae, A. Enea, L. Peyronel and F. Pinnock (eds), *Proceedings of the 1st International Congress on the Archaeology of the Ancient Near East, Rome, May 18th-23rd, 1998*, 640–642. Rome.
- Laurito, R. (2007) Ropes and Textiles. In M. Frangipane (ed.), *Arslantepe Cretulae. An Early Centralised Administrative System before Writing*, 381–394. Arslantepe V. Rome.
- Laurito, R. (2010) Textile Tools and Textile Production. The Archaeological Evidence of Weaving at Arslantepe. In M. Frangipane (ed.), *Economic Centralisation in Formative States. The Archaeological Reconstruction of the Economic System in 4th Millennium Arslantepe*, 275–285. Studi di Preistoria Orientale 3. Rome.
- Laurito, R. (2012) Changes in Textile Production at Arslantepe During the 4th and 3rd Millennia BCE. *Origini* XXXIV, 317–328.
- Mårtensson, L., Andersson, E., Nosch, M.-L. and Batzer, A. (2006a) *Technical Report, Experimental Archaeology, Part 1, 2005–2006*. Tools and Textiles – Texts and Contexts Research Program. The Danish National Research Foundation's Centre for Textile Research University of Copenhagen. www.hum.ku.dk/ctr
- Mårtensson, L., Andersson, E., Nosch, M.-L. and Batzer, A. (2006b) *Technical Report. Experimental Archaeology, Part 2:1 Flax, 2006*. Tools and Textiles – Texts and Contexts Research Program. The Danish National Research Foundation's Centre for Textile Research University of Copenhagen. www.hum.ku.dk/ctr
- Mårtensson, L., Andersson, E., Nosch, M.-L. and Batzer, A. (2006c) *Technical Report. Experimental Archaeology, Part 2:2 Whorl or Bead? 2006*. Tools and Textiles – Texts and Contexts Research Program. The Danish National Research Foundation's Centre for Textile Research University of Copenhagen. www.hum.ku.dk/ctr
- Mårtensson, L., Andersson, E., Nosch, M.-L. and Batzer, A. (2007) *Technical Report Experimental Archaeology, Part 3 Loom Weights, 2007*. Tools and Textiles – Texts and Contexts Research Program. The Danish National Research Foundation's Centre for Textile Research University of Copenhagen. www.hum.ku.dk/ctr
- Mårtensson, L., Nosch, M.-L., and Andersson Strand, E. (2009) Shape of Things: Understanding a Loom Weight. *Oxford Journal of Archaeology* 28:4, 373–398.
- McCorriston, J. (1997) The Fiber Revolution: Textile Extensification, Alienation, and Social Stratification in Ancient Mesopotamia. *Current Anthropology* 38, 517–549.
- Palumbi, G. (2010) Pastoral Models and Centralised Animal Husbandry. The Case of Arslantepe. In M. Frangipane (ed.), *Economic Centralisation in Formative States. The Archaeological*

- Reconstruction of the Economic System in 4th Millennium Arslantepe*, 149–163. Studi di Preistoria Orientale 3. Rome.
- Rast-Eicher, A. and Bender Jørgensen, L. (2013) Sheep Wool in Bronze Age and Iron Age Europe. *Journal of Archaeological Science* 40, 1224–1241.
- Rothman, M. S. (ed.) (2001) *Uruk Mesopotamia and its Neighbours*. Santa Fe.
- Sudo, H. (2010) The Development of Wool Exploitation in Ubaid Period Settlements of North Mesopotamia. In R. Carter and G. Philip (eds), *Beyond the Ubaid. Transformation and Integration in the Late Prehistoric Societies of the Middle East*. Chigaco. 169–179 (SAOC 63).
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- 1 The results of our joint research have been published in Frangipane *et al.* 2009; Laurito 2010; 2012.
 - 2 See Frangipane 1993, 42.
 - 3 Di Nocera 1998, 5.
 - 4 Frangipane and Di Nocera 2012.
 - 5 Frangipane and Palmieri 1983, 288.
 - 6 Di Nocera 2004; Frangipane 1993, 43–50.
 - 7 Rothman 2001.
 - 8 In this analysis, pierced and rounded sherds are included. Their function is not completely understood, however, our experimentation has demonstrated a possible use as spindle whorls (see below). See Sudo 2010.
 - 9 Barber 1991, 39–51.
 - 10 Choyke 2000.
 - 11 For a description of warp-weighted loom see Hoffman 1974.
 - 12 Mårtensson *et al.* 2007 and 2009.
 - 13 Frangipane *et al.* 2009, tabs 3–5.
 - 14 Frangipane and Palmieri 1983; Frangipane 1997; Frangipane (ed.) 2007; Frangipane (ed.) 2010.
 - 15 Frangipane *et al.* 2009, 8–9.
 - 16 Laurito 2007.
 - 17 Frangipane and Palmieri 1983; Frangipane and Palumbi 2007.
 - 18 Frangipane 2012, 239–253.
 - 19 Frangipane 2012, 251.
 - 20 For a complete description see Frangipane *et al.* 2001.
 - 21 Frangipane *et al.* 2009, 19–20.
 - 22 Barber 1991, 53; Mårtensson *et al.* 2006a; 2006b; 2006c.
 - 23 Rast-Eicher and Bender Jørgensen 2013; Huot 2000; McCorriston 1997.
 - 24 Rast-Eicher and Bender Jørgensen 2013, 1238.

11. Wool Economy in the Royal Archive of Mari during the Šakkanakku Period

*Laurent Colonna d'Istria*¹

The ancient city of Mari (modern Tell Hariri) is located on the banks of the Euphrates River about ten miles from the Syrian-Iraqi border. The site was excavated by a French team under the direction of A. Parrot (1933 to 1974), J.-Cl. Margueron (1979 to 2004), and P. Butterlin (2005–2010).¹

During the Early Bronze Age and the beginning of Middle Bronze Age, the city was the capital of a kingdom which extended in the Middle Euphrates valley (from Tuttul to Abu-kemal) and in the Habur valley, to the north (dry farming). During these five centuries, the 'kingdom of Mari' was conquered by Sargon of Agade (c. 2300 BC). Then, once released from the Akkadian authority, the real sovereigns of Mari, the *šakkanakkus*, governed during almost three centuries (corresponding to end of Akkad period, Gutu, Ur III, and Isin-Larsa periods). The detailed history of the 'kingdom of Mari' at the time of the *šakkanakkus* remains difficult to establish, but this kingdom was of some importance in the geopolitical landscape during this period. At the end of the 19th century BC, the Amorites took over the power and occupied the throne of Mari. Yaḥdun-Lîm, the first Amorite king, initiated a writing reform. This reform consisted of the promotion of a more Central Mesopotamian tradition, giving up the Euphrates tradition of the *šakkanakku*.² The history of Mari ended with its destruction by Hammu-rapi of Babylon in 1759 BC.³

1. Archaeological context of the new *šakkanakku*-texts (2001–2003 excavations)

During the 2001–2003 excavations at Mari (tell Hariri), J.-Cl. Margueron discovered hundreds of administrative texts from the end of the *šakkanakku* period in the levels of the 'Grand Palais Royal' (GPR). All the tablets excavated during these excavations were found in a filling level in the area North West of GPR.⁴ These administrative texts are called 'dead archives': their administrative information became obsolete, and in some cases had been used to fill the basement, a bench or were even used in the walls.

The most important group is composed of nearly 1350 tablets, fragments of tablets or sealed envelopes. It comes from the sector III-P9 SO excavated in 2002. These texts were reused in the construction: they formed a thin layer spread over several meters. Other groups of texts from the end of the *šakkanakku*-period were

discovered in 2001 and 2003 in the areas near to this sector: the group excavated in 2001 was located in the sector III-P9 NO, and it is composed of nearly 70 tablets, fragments, and sealed envelopes. These documents are badly preserved; the group of 2003 tablets came from different sectors III-P8 NE, III-P7 NO and did not exceed 25 tablets and fragments.⁵

After a preliminary reading of these documents, it appears that we are dealing with several dossiers, more or less complete. It is thus likely that these documents are contemporaneous and record various administrative operations over a period of one or two years.

2. Similarities with ARM 19

These tablets recently discovered at Mari have the same shape, layout and content, as well as similar epigraphic and linguistic characteristics, as those already published in ARM 19 by H. Limet in 1976.⁶ All of these texts had been produced by the administration of Mari palace. For example, we find documents about ‘expenditure’ (è-a) and ‘control’ (gúrum = IGI+GAR)⁷ of the ‘é ninda-sum’s in both groups of texts.⁹

From ARM 19 are:

- 16 records of expenditures of (daily wages of) women¹⁰
- 1 record of expenditures of (daily wages of) workers for Ilum-malik¹¹
- 2 records of expenditures of bread (ninda)¹²
- 1 text concerning the control/receipt of (daily wages of) women *sá érin* (‘subject to the *corvée*’)¹³

And 4 records are partially broken and their content is not identified.¹⁴

Among the new texts (TH02) we find:

- 18 records of expenditures of (daily wages of) women
- 30 records of expenditures of bread (ninda)
- 1 record of expenditure of wage since (*aštūma*¹⁵) a fixed date
- 6 texts concerning the control/receipt of (daily wages of) women
- 1 text concerning the control/receipt of (daily wages of) 1 male slave and female slave
- 1 text concerning the control/receipt of 228 sila of barley from various lands

And 16 records are partially broken and their content is not identified.

Among the heads of ‘offices’ known in ARM 19 and in the new archives, there is a man called Silāmun (see § 4.4).¹⁶ However, Šilla-Nunu, who supervises expenditures and receipts leather sandals and related materials for the treatment of leather according to ARM 19 texts, is not present in the new archives. In the same type of records, we find instead Iddin-Ilaba who is already documented in ARM 19 in two similar texts.¹⁷ These two officials are connected by ARM 19, 324 that records the expenditure of young ram’s skins by Šilla-nunu and received by Iddin-Ilaba. Because of the many similarities between the two groups of texts, we can complete some documents published with breaks in ARM 19.¹⁸

These observations suggest a temporal proximity between the *šakkanakku* texts discovered by A. Parrot (published in ARM 19 by H. Limet) and those found in the area North West of GPR during the 2001–2003 excavations. This is the reason why the documents from ARM 19 are integrated into this study, even if none of them bear a year name or number, but only days and months.

3. Chronology

At first, the texts published in ARM 19 were thought to be dated to the Third Dynasty of Ur. Later on, J.-M. Durand, studying other *šakkanakku* texts, showed that they were dated to the extreme end of the *šakkanakku* period, before the writing reform initiated by Yaḥdun-Lîm, the first Amorite king in Mari (c. 1820 BC.).¹⁹ These documents date to the second half of the 19th century BC; all ARM 19 texts are not exactly contemporaneous: some records written in the *šakkanakku* style may be dated to the first years of Yaḥdun-Lîm's reign, just before his writing reform.²⁰

Among the texts discovered in 2002 (TH02), several tablets record 'expensive gifts'.²¹ Yagîd-Lîm (*i-ki-id-li-im*), already known from ARM 19 texts, is listed among the recipients; he is probably Yaḥdun-Lîm's father. Amînum also appears as a recipient of gifts.²² He is probably the identical to the Amînum attested in the Mari Eponym Chronicle (contemporary to Ipiq-Adad II, king of Ešnunna) and in the 'Assyrian King List'; he could be the son of Ila-kabkabû and the older brother of Samsî-Addu. A Mari letter, dated to the reign of Zimri-Lîm and sent by Sammetar (probably king of Ašnakku), refers to the 'time of Amînum' prior to Samsî-Addu's time. This letter reminds the king of Mari of the repeated past misdeeds of the Lullû, people living in this eastern part of the area formed by the Euphrates and its tributary, the Habur : "The Lullû are criminals: a first time, they did wrong in Tuttul, a second time, during Amînum time, a third time, during Samsî-Addu's time. A fourth time, during Yaḥdun-Lîm's time, they did wrong. Now, these Lullû are sure to do wrong."²³ According to the Mari Eponym Chronicle and Kültepe Eponym List,²⁴ Amînum died circa 1846,²⁵ one or two years after the mention of the birth of Samsî-Addu. The mention of Amînum in the new archive implies that these texts must be dated before his death.

The administrative nature of these texts is rich in information about the history of technology (wool processing, textile manufacture and alloys of metals), the management of palace human resources, palace high officials, religious practices (cultic calendar), etc. The number of documents is such that the palace archives can only be understood by cross-referencing information about the specific offices and related themes.

However, the contents of these administrative records are very laconic compared to the records of the Amorite period (especially from Zimri-Lîm's reign). Therefore, their interpretation and administrative analysis are in some cases limited.

4. Data relating to wool economy

Administrative texts recording wool (*sîg*) are relatively few. However tablets relating to the wool economy are more numerous and must be understood through different office archives. They deal with some aspects of the wool economy, from the plucking of the animals, the washing, various treatments of textiles, to the gift of garments.

The following documents will be analyzed:

- two account tablets dealing with plucked wool (TH02-T232 and TH02-T342)
- (daily wages of) women for wool processing (TH02-T164)
- tablets referring to *nisKum* 'top quality wool' or 'fabric'
- the office of Silâmun referring to the 'cleaning' and 'washing' of textiles.
- the price of various textiles/clothes

4.1. Plucked wool

In the archives dated to the end of *šakkanakku* period, only two texts (TH02-T342 and TH02 – T232) record the expenditure of wool plucked on sheep and goats. The text is laconic: the wool is transferred to the responsibility of an administrator and nothing is said about the recipient or the use of the wool.

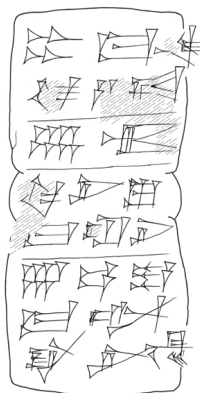
The term used for ‘plucking’ is *gizzat(um)*, derived from the root GZZ. This term is among those attested in the *šakkanakku* period which are not used after the writing reform of Yaḥdun-Lîm.²⁶ Instead of *gizzat(um)*, we find *buqûm(um)*, derived from the root BQM, most commonly used in the 2nd millennium BC texts. These two documents record expenditure of a weight of wool plucked from a given amount of sheep, which provides a ratio of the weight of wool collected per sheep or goat.

TH02–T232 (3,4 × 3,4 × 1,6 cm)

- | | |
|--|---------------------------------------|
| o.1. 4 ma-na / ṛgi ₂ -za-at ⁷ | 4 minas (of hairs) plucking of |
| 2. 8 ùz | 8 she-goats |
| r.3. ṛsá ¹ l-lu- / ṛma ⁷ -ra-l | of Iluma-rā ¹ (‘s office). |
| 4. 7 ud iti / ma-al- / kà-ni-in ₄ | Day 7, month ii. |

Ratio

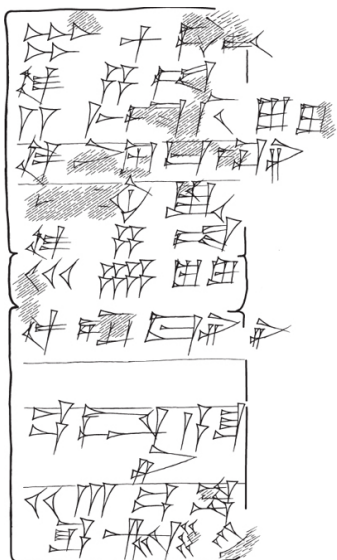
30 shekels/goat
(≈ 251 g/goat)



TH02-T232 records the wool plucked under the responsibility of Ilumarā¹i and unlike most of the administrative texts from the *šakkanakku* period, it does not mention an administrative key-word. As a parallel to TH02-T342, this text may record an expenditure. TH02-T232 gives a ratio of 250 g of hairs per she-goat. The goat is a smaller animal than the sheep; it obviously appears that the yield of hair per goat is lower than the amount of wool produce by a sheep. It is impossible to determine if there are 8 she-goats or varieties of goats because the logogram ùz can be used in both cases.

TH02-T342 records expenditures of wool simultaneously by the office of Rama-ilî and by the office of Iluma-rā¹i. From this text, two different ratios can be computed: 835 g per sheep (1.66 mina/sheep) and 795 g per sheep (1.58 mina/sheep). The difference between the two ratios is small (40 g). This is probably due to the statistical variability of the amount of wool per sheep, however, we cannot exclude the possibility that it might be due to different varieties of sheep. However, the text of the document does not report different varieties of sheep. The number of sheep in these two operations is followed by the logogram udu-udu, graphic duplication of the logogram udu (in the *šakkanakku* graphics system, the duplication of a logogram is a way to express the plural). The first meaning of logogram udu is ‘sheep’ and the semantic extension of this logogram may also refer to any type of sheep. It is then possible that the logogram refers to *stricto sensu* a plural for ‘sheep’ but also a set of different varieties of sheep as suggested in text

TH02-T755.²⁷ These two uses are corroborated by the fact that after the writing reform the use of udu-udu is abandoned in favor of the udu-*hi-a* which designates the plural as ‘sheeps’²⁸ meaning ‘sheep of various varieties’.²⁹ Therefore it cannot be excluded that the wool comes from different varieties of sheep. Moreover, the two administrators Iluma-rā’i and Rama-ilī are in charge of the offices which are responsible for various types of sheep (and goats). These animals appear always in small numbers and were probably bred for cultic purposes (see table opposite).



TH02-T342 (4.4 × 4.6 × 1.9 cm)

1. 5 ½ ḡú sīg /
gi₂-za-at / 2 me-at lá 1 udu-udu
2. sá ḡ-lu-ma-ra-i
3. ḡ³ ḡú sīg / ḡi₂-za-at /
38 udu-udu
- r.4. sá ra-ma-i-lī
5. blank space
6. è-a-šu-ni²⁷
7. 23 ud iti / e-bir-tin

5 ½ talents of wool
plucking of 199 sheep
of Iluma-rā’i(’s office).
1 talent of wool plucking
of 38 sheep
of Rama-ilī(’s office).

Ratio

≈ 1 mina 39½ shekels/sheep
(≈ 835 g./sheep)²⁶

≈ 1 mina 34¾ shekels/sheep
(≈ 795 g./sheep)

Expenditure of their (office).
Day 23, month v.

These texts recording expenditure of wool are dated to the months ii and v. So they do not concern wool immediately after plucking since this operation was done during the month xii (April)³⁰ according to texts from Mari Amorite period. The wool was issued from the flock managed by Iluma-rā’i and Rama-ilī and kept until requested. The two documents do not give any recipient. It is possible that the operation is internal to the palace.

Both ratios, 835 g/sheep (1.66 mina/sheep) and 795 g/sheep (1.58 mina/sheep) deducted from TH02-T342 are in agreement with averages found by H. Waetzoldt in the Ur III sources.³¹ However in Mari during the Amorite period, the ratio was about 2.5 mina per sheep:³² the text M.11539 refers to 24½ minas of wool from 10 white sheep, which gives a ratio of 1.22 kg/sheep (approx. 2.5 mina). Another document, M.10376, records 14 talents and 16 minas of wool from the plucking of 300 sheep. The ratio in this case is slightly higher: 1.42 kg/sheep. The difference is probably due to the variety of sheep in M.10376 since it is clearly stated that it is udu-nita ‘male sheep’, while M.11539 mentions udu-hi-a babbar, ‘white sheep’ (male, female and young). Besides wool ratio per sheep, these Amorite documents list the amount of wool according to its quality.³³ This administrative practice, which is well-known in southern Mesopotamia,³⁴ may help to determine the ratio of wool quality per sheep. Among the types of wool listed in the document M.10376 Mari is the sīg *nisqum* ‘top quality wool’ which possibly corresponds to the *nisKum* in the *šakkanakku* texts (see § 4.3).

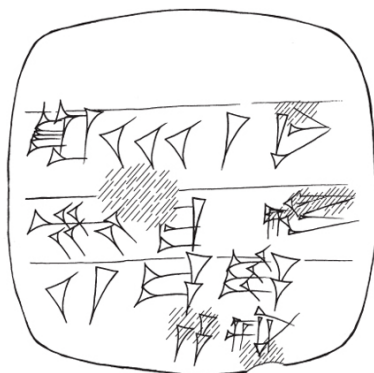
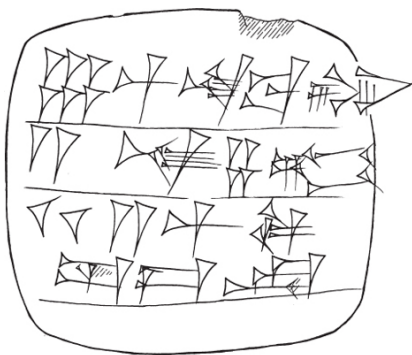
Expenditure (from the office) of Iluma-rā'i		
the gate of:		
du ₆ -ki		
the gate of:		
sheep, 1 lamb(-male):		
the temple of Ninḥursag		
the gate of:		
sheep:		
the gate of maš-tab-ba		
the gate of:		
Der		
the gate of Dagan		
lamb		
for the sangal(-priest)		
for the sangal(-priest)		
lamb:		
the temple of Ilaba		
male lamb		
...		
the gate of:		
Adad		
goats:		
the gate of nin?-nim?		
Control of Rama-ili		
the gate of:		
of copper		
of the official-kuš		
ropes(-nanaptum)		
Expenditure (from the office) of Rama-ili		
lamb		
for the sangal(-priest)		
lamb:		
Zizatum(NP)		
the gate of:		
the temple of Ninḥursag		
male goat:		
1: the temple of nin-il-tin?		
1: du ₆ -ki		
the gate of:		
for the sangal(-priest)		
for the sangal(-priest)		
1 kid:		
1: the gate of marratum		
1: temple Belet-ekallim		
ewe, 1 ewe:		
Der		
the gate of:		
the temple of nin'-il-tin		
for the sangal(-priest)		
sheep, n she-goat (for) ..		
...		
... of the bank (e-bir ₅ -tin)		
the gate of:		
for the sangal(-priest)		

TH02-T164:
bīt tā'irtin
ARM 15.264 tongues(lišānu) for a bouffon-aluzinnum

M.11539 (ARM 30, p. 316)		Ratio wool/sheep	% per sheep
o.1. 3½ [ma-na sīg sag]	3½ minas of wool first quality	21 shekels/sheep	= 14.29%
2. 21 ma-na sīg ús	21 minas of standard wool quality	2 minas 6 shekels/sheep	= 85.71%
blank space	-----		
3. šunigin 24½ ma-na sīg	Total: 24½ minas of wool	2 minas 27 shekels/sheep	= 100%
4. bu-qú-um 10 udu-ḫi-a babbar	plucking of 10 white sheep	(≈ 1.22 kg/sheep)	
i.e. ša i-na ki-sa-al-lim	which in courtyard		
6. iz-zí-za	were installed,		
7. si-lá ma-ši-im	entrusted to Māšum		
r.8. i-na ma-ri ^{ki}	in Mari.		
blank space	-----		
9. iti ú-ra-ḫi-im	Month i,		
10. ud 8-kam	Day 8.		
11. mu zi-im-ri-li-im	Year Zimrī-Līm 6.		
[ma-a(?)]-sú ú-ub-bi-bu			
M.10376 (ARM 30, p. 462)		Ratio wool/sheep	% per sheep
o.1.16 ma-na sīg ni-is-qú sag	16 minas of the highest	3,2 shekels/sheep	= 1.88%
	top quality wool,		
2. 2 gú sīg ni-si-iq munus-ús-bar	2 talents of top quality wool,	24 shekels/sheep	= 14,01%
	by women weavers		
3. 12 gú sīg gur-nu ús	12 talents of coarse wool,	2 minas 24 shekels/sheep	= 84,11%
4. ša 3 me udu-níta-ḫi-a	from 300 male sheep		
5. ša i-na qa-aṭ-tú-na-an ^{ki}	which in Qaṭṭunan		
6. ib-ba-aq-ma	were plucked.		
blank space	-----		
7. šunigin 14 gú 16 ma-na sīg	Total: 14 talents 16 minas of wool.	2 minas 51 1/5 shekels/	= 100%
blank space	-----	sheep (≈ 1.42 kg/sheep)	
8. iti ʿḫilib	Month vi,		
9. ud 30-kam	Day 30.		
10. gir za-ki-ra-ḫa-mu	Under the responsibility of		
11. ú la-i-im	Zakīra-ḫammu and Lā'ūm.		

4.2. TH02-T164: (daily wages of) women for wool processing

The text TH02-T164 is unique. It records a ‘deposit’ (mu-qú-tum35) of the women wages for three wool processing operations. It is possible that these three operations are stated on the tablet in an order following the various tasks related to wool processing and performed by women.



TH02-T164 (4.6 × 4.6 × 1.7 cm)

- o. 6½ *na-pá-šum*
2. 2 *na-sà-Kum*
3. 22½ *sá / iš IS-rí*
- r.4. blank space
5. *šunigin 31 munus*
6. *mu-^rqú-tum^r*
7. 11 *ud iti / a-bi*

6½ (daily wages for) airing,
2 (daily wages for) selecting (or weaving),
22½ (daily wages for) those for/to ...

Total 31 (daily wages of) women.

Deposit.

Day 11, month iv.

The first two operations are designated by verbs in the infinitive: *napāšum* is the action ‘to air’,³⁶ *na-sà-Kum* should probably be the verb *nasāqum* ‘to select (wool)’, in this case the action is related with the sorting of wool (*nisqum*) already attested in the Amorite document M.10376.³⁷ However one cannot exclude the possibility that *na-sà-Kum* is the verb *nasākum* ‘to weave’ noticed by J.-M. Durand in the Amorite letter A.1285.³⁸ The third operation *sá iš IS-rí* is more difficult to translate: ‘those for ...’. The sequence *IS-rí* has no equivalence in the *šakkanakku* texts. It must be a noun formed on PiRS pattern designating an action to be associated with the treatment of wool. The root of the word cannot be determined with certainty. The term could derive from different verbal bases:

- *ešērum* ‘to mend’ noted by S. Lackenbacher in an Old Babylonian text from Larsa about the treatment of clothing.³⁹ However, this text does not refer to any wool operation, but to the finishing of textiles by *lú-ázlag*. The word mending could make sense in this tablet if we accept the reading *nasākum* ‘to weave’ since the mending comes after weaving;
- *ešērum* (YSR) ‘to draw’, in this case *IS-rí* would refer to ‘decorations’.

4.3. *nisKum* ‘top quality wool or ‘fabric’ (Appendix 2)

In ARM 19, the word *nisKum* (*ni-is-Kum*) is mentioned twice (ARM 19, 321; ARM 19, 393). This word is formed on the PiRS pattern. According to J.-M. Durand, it must be differentiated from *nisqum* ‘top quality wool’, a PiRS pattern on *nasāqum* ‘to choose’, known in the Amorite period by the expressions: *síg ni-si-iq lú-túg / síg ni-si-iq munus-ús-bar*, or *síg ni-is-qú sag* (M.10376, cf. above) and *síg ni-is-qú-um*.⁴⁰ The word *nisKum* in the *šakkanakku* texts would be a PiRS pattern on *nasākum* ‘to weave’ and would then be a ‘fabric’.⁴¹

We now have seven new occurrences of this word: it appears six times as the subject of administrative transactions between different services (in this case it is

measured by the weight system: x ma-na/gín *ni-is-Kum*), and one where it describes the activity of a woman (munus *sá ni-is-kín*).

The meaning ‘fabric’ attributed to *niskum* by J.-M. Durand seems appropriate in all the documents. However, due to the minimal contents of these tablets and the kind of transactions, we cannot totally exclude that *niskum* means ‘top quality wool’ (*nisqum*) as in the Amorite texts. No logogram precedes or follows *ni-is-Kum*. The text T.518,42 written in the ‘šakkanakku-style’, mentions *túr-ru síg* ‘type of wool’ which is equivalent in the Amorite period to *síg túr*. Thus the absence of a determinative logogram associated with *niskum* could be a clue supporting the interpretation of J.-M. Durand. A presentation of all occurrences according to the administrative office is given below.

Ref.	Object of the administrative transaction	Key-word (+ administrator)	Date
TH02-T321	½ (daily wage of) woman assigned to <i>niskum</i>	Expenditure (from the office of) Būr-Mamma	iv / 18
TH02-T853	2 minas of <i>niskum</i> (for) Bibi, túg-du ₈	Expenditure (from the office of) Būr-Mamma	vi / 27
TH02-T88	2 shekels of <i>niskum</i> red and black, (for) Iddin-Mamma, ‘musician’	Expenditure (from the office of) Būr-Mamma	xii / 7
TH02-T64	5 minas and 40 shekels of <i>niskum</i> weight of a fringe, (<i>niskum</i>) of 2 clothes. Puzur-Kakka received	Expenditure (from the office of) Dérítum-níri, female musician	viii / 4
ARM 19, 321	3 minas of <i>niskum</i> weight of a fringe, [(<i>niskum</i>) of n clothes?], Iddin-laba received	Expenditure (from the office of) Nunu-litiya (female musician)	viii / 30
TH02-T18	1 ½ mina <i>niskum</i> weight of fringe of garment of Dumuzi; I received from Išma'-Akka	Deposit (<i>mu-qi-tum</i>)	iv / 16
TH02-T327	n mina(s) of <i>niskum</i> of ‘middle parts’ (<i>qabliyātum</i>) weight of 4 túg-bár-gaba-ki, ⁴⁹ Ir'ib-Dagan received	Expenditure (from the office of) Išma'-Akka	? / 29
TH02-T953	5 minas <i>niskum</i> of ‘middle parts’ (<i>qabliyātum</i>) [...]	[...]	i / n
ARM 19, 393	n mina(s) [...] <i>niskum</i> of ‘middle parts’ (<i>qabliyātum</i>) (<i>niskum</i>) for clothes?	Control of Eštar-tal'e, female musician.	vi / 12

4.3.1. Office of Būr-Mamma

According to TH02-T853, Bibi, a túg-du₈, received 2 minas (≈ 1 kg.) of *niskum* from the service of Būr-Mamma. In southern Mesopotamian sources, the raw material of this kind of craft is more generally low quality wool and goat hair. With this material the túg-du₈ makes yarn, ropes, string, mattresses and other knotted/plaited cloth used in various ways.⁴⁴ A Mari letter, dated to reign of Zimrī-Līm, refers to the work of Dan-El, a túg-du₈: Maprakum asked the official, Mukannišum, to have brought to him 10 shekels of (wool-)duḥšum, 3 minas of wool, 40 shekels of madder and 10 shekels of alum so that the túg-du₈ could make ḥullum-rings and bridles-(*appatum*).⁴⁵ And in ARM 21 326 (dated to the same period) the túg-du₈ received 7 minas of *síg us* (wool of *second quality*). The word *niskum* in TH02-T853 could refer to ‘top quality wool’ (*nisqum*). However, it would not be expected that a túg-du₈ would use fabric (*niskum*).

TH02-T88 records the expenditure from the service of Būr-Mamma of 2 shekels (17 g.) of red and black *niskum* attributed to Iddin-Mamma, a musician. The use of the *niskum* by the musician is unknown. The low weight and the reference to the colors ‘red and black’ could be a clue for a small piece of woollen fabric.

TH02-T321 records the expenditure of half a salary for a qualified worker *sá ni-is-Kín*. The sequence munus *sá ni-is-Kín* is reminiscent of TH02-T164 where wages of women are recorded for the operation of *na-sá-Kum*. This sequence (munus *sá*

ni-is-Kín) can be compared with *simug šu bi-lim* ‘smith for alloy’ (ARM 19, 342); it clearly shows that *nisKum* is the product resulting from an action (PiRS pattern), but which one: *nasākum* or *nasāqum*? If the term here corresponds to ‘fabric’, then *munus sā ni-is-Kín* may refer to ‘women assigned to weaving’ and this expression could be the equivalent to *munus-ús-bar* used in the Amorite documentation (and in southern Mesopotamia).

The activity of Būr-Mamma is difficult to determine because, apart from these three documents, only ARM 19, 305 and TH02-T422 refer to his service:

- TH02-T422: expenditure from Būr-Mamma of 5 shekels (≈ 42 g) of flax received by Puzur-kakka.
- ARM 19, 305: control and receipt (*gúrum*) by Būr-Mamma of 13 *giš-gag gal* ‘poles’ and 27 *giš-gag tur-tur* ‘pegs’. It is likely that these wooden ‘poles and pegs’ were pieces of looms.

4.3.2. Offices of female musicians (*nar-munus*)

In the texts TH02-T164 and ARM 19, 321,⁴⁶ *nisKum* could designate a ‘fabric’ which forms a fringe. Indeed, TH02-T64 records the expenditure of 5 and 2/3 minas (≈ 2.85 kg) and 3 minas (≈ 1.5 kg) of *nisKum*, weight (of) a *sissiktum* ‘fringe’ and (this *nisKum* is) from should this be two pieces of cloth (*túg*). The structure of the text clearly suggests that the fringe has to be done with *nisKum* from two pieces of cloth.

ARM 19, 393 reports the delivery of *ni-is-Kum šu qab-li-Wa-tin* made to a female musician. J.-M. Durand understands *qabliyātum* as the plural of the cloth *qablītum* (documented in VS 9221).⁴⁷ The sequence *ni-is-Kum šu qab-li-Wa-tin* is now documented by two new texts. TH02-T953: 5 ma-na *ni-is-Kum šu qab-li-Wa-tin* ki-lá-bi [...] and TH02-T327: x ma-na *ni-is-Kum šu qab-li-Wa-tin*, ki-lá-bi, 4 *túg-bàr-gaba-ki*. The term *qabliyātum* in these documents could refer to the ‘middle parts’. If actually *nisKum* means ‘fabric’, thus *niskum šu qabliyātin* could designate the middle parts well preserved, taken from frayed fabrics which are used, in the case of TH02-T327, for the process of 4 *túg-bàr-gaba-ki*.

In some texts, the person checking and receiving (*gúrum*), or supervising the expenditure (*è-a*) of *nisKum* is a female musician:

- ARM 19, 393: Eštar-tal’e, *nar-munus*, received *nisKum šu qabliyātin* ;
- TH02-T64: Dērītum-nīrī, *nar-munus*, oversaw the expenditure of 5 minas and 40 shekels of *nisKum* (corresponding to the weight of a fringe);
- ARM 19, 321: Nunu-lītiya oversaw the expenditure of 3 minas *nisKum* (corresponding to the weight of a fringe). Although her function is not specified, she must be a female musician (see ARM 19, 408).

The reason why musicians are mentioned here may be due to the nature of the product. Indeed, if *nisKum* means ‘a fabric’, it is possible that the different steps mentioned above are linked with the collection of old woven materials belonging to palace female musicians. Management of wool can also be part of the female musicians’ tasks:

- ARM 19, 408:⁴⁸ Nunu-lītiya, *nar-munus*, received (*gúrum*) wool used in the manufacture of caps
- ARM 19, 314:⁴⁹ Dunnatin, *nar-munus*, received (*gúrum*) 10 2/3 minas of wool ... for the process of one or more pieces of cloth for the *šakkanakku*.

In both documents, the wool is associated with the manufacture of textile products and received by a female musician.

4.3.3. Office of Išma'-Akka (Appendix 3)

In the previous table concerning *nisKum*, the official Išma'-Akka appears twice:

- TH02-T327: *nisKum* from 'middle part' expended from his office
- TH02-T18 records 1½ mina of *nisKum* as a fringe of the garment of Dumuzi from the Išma'-Akka's office.

One may add the following text, TH02-T438, concerning his activities: it records a delivery to another head of *nisKum*?, weight of cloth-Nergal (type of cloth?). Then, TH02-T642 records the expenditure from his office of 95 1/3 daily wages of women for weaving a garment- $\text{ĪB} \times 3(\text{diš})_{50}$ for the *šakkanakku*. These administrative documents show that at least one of Išma'-Akka's activities was related to wool or textile work.

Ref.	Object of the administrative transaction	Key-word (+ administrator)	Date
TH02-T18	1½ mina of <i>nisKum</i> weight of fringe garment of Dumuzi; I received from Išma'-Akka	Deposit (<i>mu-qū-tum</i>)	iv / 16
TH02-T438	[..... <i>nisKum</i> ?] weight of garment of Nergal? I received from Išma'-Akka	Deposit (<i>mu-qū-tum</i>)	[...]
TH02-T327	n mina(s) of <i>nisKum</i> (of/from) 'middle parts' (<i>qabliyātum</i>) weight of 4 <i>tūg-bār-gaba-ki</i> , Ir'ib-Dagan received.	Expenditure (from the office of) Išma'-Akka	? / 29
TH02-T642	95 1/3 (daily wages of) women (via) <i>Īda-ilum</i> , (for) 2 $\text{ĪB} \times 3(\text{diš})$ <i>tūg</i> of <i>šakkanakku</i>	Expenditure (from the office of) Išma'-Akka	ii / 26
TH02-T718	1 (daily wage of) woman in <i>érin</i>	Expenditure (from the office of) Išma'-Akka	iii / 13
TH02-T203	1 (daily wage of) woman 'ill'	Expenditure (from the office of) Išma'-Akka	v / 26
TH02-T238	1 (daily wage of) woman 'ill'	Expenditure (from the office of) Išma'-Akka	v / 27
TH02-T839	4 (daily wages of) women in <i>érin</i> 1 (daily wage of) woman 'ill'	Expenditure (from the office of) Išma'-Akka	vi / 04
ARM 19, 22	3 (daily wage of) women <i>šu érin</i>	Control of Išma'-Akka	iv / 20
ARM 19, 23	1 (daily wage of) woman in <i>érin</i> 1 (daily wage of) woman 'ill'	Expenditure (from the office of) Išma'-Akka	v / 28

Other expenditures from office of Išma'-Akka concern daily wages for women. They are said to be 'ill' or '*in érin*'. These terms suggest that the daily ration for these women differs from the traditional ration (x munus è-a NP). Due to activities of the Išma'-Akka's office related to *nisKum*, it is likely that these texts record the expenditures of food rations for women involved in various operations dealing with wool processing, or relating to the manufacture of textile (or other activities such as mending or recovering pieces of cloth).

4.4. The office of Silāmun referring to the 'cleaning' and 'washing' of textiles (Appendix 4)

Silāmun⁵¹ is one of the officials documented both in the archives published by H. Limet (ARM 19) and in the new archives. As the year is never mentioned in these documents, it is difficult to correlate them together. Therefore in the following tables, we separate both archives.

The office of Silāmun must be related to the treatment of textiles, especially the 'finishing' and 'washing'. To better understand his activity, a classification by keyword è-a and *gúrum* and by theme is necessary.

4.4.1. Expenditures of hardware and daily wages.

The majority of the documents belonging to Silāmun's office are records of expenditures (è-a). He oversees the output of small amounts of i 'oil' and *ga-bi-a-nu*

used in the treatment of various fabrics. Expenditures of oil and *ga-bi-a-nu* are recorded separately.

‘Expenditures’ from Silāmun’s office: oil (i) for garments/clothes

Ref.	Object of the administrative transaction (è-a) (1 sila ≈ 1 litre)	Date	Ratio oil/garment
TH02-T79	1¼ sila of oil for 1 tûg-nāsisum ⁵⁷ of market [?] (šu lam-ki ⁵³) (issued to) servant of the lord (ir ₁ , lugal ⁵⁴)	v / 04	1 sila ¼ /tûg-nāsisum
TH02-T661	7½ sila of oil for 6 tûg-nāsisum of market [?] [...]	viii / 20	1 sila ¼ /tûg-nāsisum
TH02-T826	2½ sila oil for 2 tûg-nāsisum of market [?] (issued to) servant of the lord	ix / 01+n	1 sila ¼ /tûg-nāsisum
TH02-T34	1/3 sila of oil for 2 tûg-bitrām (issued to) servant of the lord	ix / 06	¼ sila /tûg-bitrām
TH02-T312b	½ sila oil for 3 tûg-bitrām (issued to) servant of the lord	xii-bis / 02	¼ sila /tûg-bitrām
ARM 19, 113	n sila of oil for 2 tûg	vii / 24	---
ARM 19, 311	3? sila 15 ŠE of oil for 5 tûg-nāsisum of market [?] and 3 tûg-bār-gaba-ki	vii / 29	---

‘Expenditures’ from Silāmun’s office: *ga-bi-a-nu* for garments/clothes

Ref.	Object of the administrative transaction (è-a)	Date	Ratio <i>ga-bi-a-nu</i> / garment
TH02-T132	24 shekels of <i>ga-bi-a-nu</i> for 1 tûg-nāsisum of market [?] (šu lam-ki) (issued to) servant of the lord (ir ₁ , lugal)	v / 14	24 shekels /tûg-nāsisum
TH02-T37	48 shekels of <i>ga-bi-a-nu</i> for 2 tûg-nāsisum of market [?] (issued to) servant of the lord	v / 19	
TH02-T324 ⁵⁵	24 shekels of <i>ga-bi-a-nu</i> for 1 tûg-nāsisum of market [?] (issued to) servant of the lord	x / 6	
TH02-T186	24 shekels of <i>ga-bi-a-nu</i> for 1 tûg-nāsisum of market (issued to) servant of the lord	xii / 28	
TH02-T588	30 shekels of <i>ga-bi-a-nu</i> for 1 tûg-sal (fine garment) of Dêritum	viii / 30	30 shekels/tûg-sal
ARM 19, 315	12 shekels of <i>ga-bi-a-nu</i> for 1 tûg-šanubtum ⁵⁶	ix / 11	12 shekels/tûg-šanubtum

The term *ga-bi-a-nu* has been linked etymologically to the Akkadian *gabû/gabiu* and Aramaic *gabbeya* ‘alum’ by H. Limet.⁵⁷ The form *ga-bi-a-nu* would be a dialectal variant. The meaning ‘alum’ given to *ga-bi-a-nu* seems inappropriate if the activities of Silāmun’s office are truly cleaning or washing textile.⁵⁸ Indeed, alum is usually associated with dyeing or tanning,⁵⁹ but not washing. Because of expenditures of oil from Silāmun’s office, *ga-bi-a-nu* could have been used like potash (naga) in Ur III texts⁶⁰ and used to make soap (or soapy water); *ga-bi-a-nu* could be an ‘alkali’.

A mu-qû-tum-tablet (not belonging to the archive of Silāmun) records the deposit of 20 shekels of *ga-bi-a-nu* for a bad-tûg cloth.⁶¹

His office also makes documents recording expenditure of labor. These records are of two kinds, a series on cleaning: *ru-si im-sà-’à* / *tim-sà-u* = *rūšīyimsah(ā)* / *timsahū* ‘he/they cleaned dirty (wool/textile)’,⁶² a second series on workers from conscription or ‘subject to the corvée’ (*in érin*), and whose activity is not specified

‘Expenditures’ from Silāmun’s office (daily wages of) workers assigned to cleaning (*rūšī yimsah(ā)* / *timsahū*)

Ref.	Object of the administrative transaction (è-a)	Date	Ratio
TH02-T37	(who) cleaned dirty (textile) (issued to) servant of the lord	v / 19	48 shekels /tûg-nāsisum
TH02-T324 ⁵⁵	(who) cleaned dirty (textile) (issued to) servant of the lord	x / 6	24 shekels /tûg-nāsisum
TH02-T186	(who) cleaned dirty (textile) (issued to) servant of the lord	xii / 28	24 shekels /tûg-nāsisum
TH02-T588	(who) cleaned dirty (textile) (issued to) servant of the lord	viii / 30	30 shekels/tûg-sal
ARM 19, 315	(who) cleaned dirty (textile) (issued to) servant of the lord	ix / 11	12 shekels/tûg-šanubtum

VI0221/377	wages of) workers in érin	
VI0221/398	wages of) workers in érin	
VI0221/399	wages of) workers in érin (?)	
VI0221/655	wages of) workers in érin	
ARM 19, 61	wage of) worker in érin	
1	(daily wage of) worker 'ill'	
ARM 19, 61	wages of) workers in érin	

On one occasion, a record (TH02-T525) refers to a *ma-ša-ar-tum ma-ad-ṣi/ú?* 'guardian ...?' and to 3 gurus in érin 'subject to the corvée (or conscripts)' probably monitored by the overseer. Only ARM 19, 61 records the expenditure of 9 workers qualified by *šu ki-ba-en* where the meaning is unknown.⁶³ Similar records relate relative to the female workforce for wool processing (e.g. TH02-T164, belonging to the Išma'-Akka's office), these tablets record rations corresponding to a working day or part of a day. Similarly, 'ill' workers are always mentioned separately and per unit. They were likely to receive a wage or special treatment.

'Expenditures' from the office of Silāmūn (daily wage of) *maršum* 'ill' workers

Object of the administrative transaction (è-a)		
VI0221/404	wage of) worker 'ill'	
VI0221/349	wage of) worker 'ill'	
VI0221/388	wage of) worker 'ill'	
VI0221/4	wage of) worker 'ill'	
VI0221/108	wage of) worker 'ill'	
VI0221/109	wage of) worker 'ill'	
VI0221/111	wage of) worker 'ill'	
ARM 19, 61	wage of) worker in érin	
1	(daily wage of) worker 'ill'	

The expenditures of oil, *ga-bi-a-nu* and wages for workers, some of which being described as 'they cleaned dirty (wool/textile)', clearly show that Silāmūn manages the budget for materials and salaries for 'cleaning' of textiles.⁶⁴

4.4.2. Checking and reception (gúrum) of washed textiles and daily wages by Silāmūn

Some records check the reception (gúrum) by Silāmūn of clothes qualified as *ma-as-um/mashum/* (sg.) or *ma-as-u-tum/mashūtum/* (pl.) 'washed'. This adjective is formed on *msh* 'wash' that is also found in an expression for qualifying workers: *n gurus rūši yimsah(ā) /timsahū*. Among the washed clothes under the authority of Silāmūn, some *túg-nāsisum šu lam-ki* (of market?) are found. Thus, it is not excluded that *ga-bi-a-nu* and oil were expended from Silāmūn's office for cleaning these clothes. The date of texts can confirm this hypothesis in some cases.

'Checking and reception' of washed clothes by Silāmūn

Object of the administrative transaction (gúrum)		
VI0221/204	ga-bi-a-ki / washed	
VI0221/175	šum of market? (<i>šu lam-ki</i>) / washed	
VI0221/196	šum of market? / washed	
ARM 19, 61	ga-bi-a-ki / washed	
ARM 19, 61	ga-bi-a-ki (from) the temple of gods / washed	

Among the objects checked by Silāmūn, we find the same types of clothes mentioned above and followed by the term *ha-u*. This term is never prefixed by the logogram *túg* and is invariable whatever the number. According to J.-M. Durand,

ḥa-u must be the same item as *túg ḥa-WA* (also invariable) known from Amorite texts (from Mari) and designating a kind of ‘carpet’.⁶⁵ Thus *ḥa-u* can refer to (or designate) the function of the cloth mentioned in the tablet above.

‘Checking and reception’ of clothes – *ḥa-u* – by Silāmun

Object of the administrative transaction (gúrum)	
YHU 2.220 / <i>ḥa-u</i>	
YHU 6.214 / <i>ḥa-u</i>	
ARM 15.312- <i>u</i>	

In addition to being in charge of clothes, Silāmun controls a particular category of workers qualified by *šu DAL-lim*. For A. Westenholz⁶⁶ this expression may designate ‘those of the door-post’, ‘janitors?’. According to P. Villard, the term *DAL-lim* in the *šakkanakku*-texts may be the same as that seen in ARM 23, 623: this text records two lists of workers qualified respectively by the following expressions: l. 30: 33 *lú a-li-i[k] ta-al-lim*, and. l.53: 23 *lú ša egir lugal*. The construction suggests that *âlik tallim* refers to the type of work. P. Villard, as the editor of this document, proposes to understand the *âlik tallim* in the same way as *âlik eqlim*, which designates staff working in the fields: ‘*âlik tallim* pourrait désigner des hommes réquisitionnés pour le transport de grumes ou des poutres, ou éventuellement pour des corvées de bois’.⁶⁷ So, if *DAL-lim* is a kind of wooden pole, *guruš šu DAL-lim* could correspond to the workers carrying textiles using a particular method, with the textile wound around a pole.⁶⁸ However, this interpretation raises another difficulty, because elsewhere *šu DAL-lim* qualifies 10 boatmen whose work is to caulk boats.⁶⁹ The number of *guruš šu DAL-lim*, in these different records, suggests an organization by team.

‘Checking and reception’ of (daily wages of) workers *šu DAL-lim*

Object of the administrative transaction (gúrum)	
YHU 2.220 / wages of) workers <i>šu DAL-lim</i>	
SH 025 / wages of) workers <i>šu DAL-lim</i>	
ARM 2.19 / wages of) workers <i>šu DAL-lim</i>	
ARM 10.4 / wages of) workers <i>šu DAL-lim</i>	
ARM 12.9 / wages of) workers <i>šu DAL-lim</i>	
ARM 14.9 / wages of) workers <i>šu DAL-lim</i>	
ARM 15.3 / wages of) workers <i>šu DAL-lim</i>	

4.4.3. Expenditures of clothes/fabrics

After having checking and receiving various washed clothes and various textiles used as a *ḥa-u* ‘carpet’ in his office, Silāmun sent out from of his office various clothes. Most of these were destined for the palace. These clothes are of the same type as seen in the previous administrative transactions. Also, as in previous operations, in some cases the lord’s servant acts as an intermediary.

Ref.	Object of the administrative transaction (è-a)		Date
TH02-T32	2 túg- <i>bitrám</i> for the palace (via) servant of the lord (ir ₁₁ lugal)		i / 11?
TH02-T909	1 túg-Nergal, 2 túg-bàr-gaba-ki 1 veil (<i>kutummum</i>)	for the palace	viii / 7
TH02-T636	2 túg- <i>nāsīsum</i> of market? (<i>šu lam-ki</i>) for the palace (via) servant of the lord		viii / 27
TH02-T924	2 túg-sal 1 túg-BU	for [...]	viii / 27
TH02-T720	1 túg- <i>nāsīsum</i> of market? / washed [...]		x / 8
TH02-T639	1 túg- <i>nāsīsum</i> of market? for the palace (via) servant of the lord		xii / 4
TH02-T1000c	cloth(es)(?) for the palace		vii / 29
TH02-T901	cloth(es)(?) for the palace (via) servant of the lord		xii / 28?
TH02-T795	2 túg-bàr-gaba-ki for the palace		[...]
TH02-T997g	22 túg- <i>nāsīsum</i> of market? [...]		[...]
ARM 19, 312	5 túg-sal for the palace		viii / 10+

4.4.4. *mu-qú-tum-tablet concerning clothes*

Another type of document where *Silāmūn* is not mentioned has to be added to these series of records. These are documents where the keyword is *mu-qú-tum* ‘deposit’ and deal with the cloth *túg-nāsīsum šu lam-ki*. The combination of this type of document with the activity of *Silāmūn* can be determined by the objects of administrative transactions: in TH02-T63 he receives funding for 50 workers to treat *túg-nāsīsum šu lam-ki*; the same day (14 / v) he issues an amount of *ga-bi-a-nu* required for the treatment (TH02-T132), and an expense of wages for 50 workers of which it is said ‘they cleaned dirty (wool/textile)’. The wages of workers in both cases are transmitted via the lord’s servant. Two other similar *mu-qú-tum*-tablets record the deposit of daily wages of workers for 1 *túg-nāsīsum šu lam-ki*: in TH02-T937 +, the wages are transmitted by a man named Inil-SA.TU who is unfortunately not known elsewhere, and in ARM 19, 332, the deposit is not made via an intermediary.

Ref.	Object of the administrative transaction			Oey-word (+ administrator)	Date
TH02-T63	50 (daily wages of) workers	for 1 <i>túg-nāsīsum</i> of market?		Deposit	v / 14
TH02-T764i	50 (daily wages of) workers (who) <i>cleaned dirty (textile)</i>		(via) servant of the lord	Expenditure (from the office of) <i>Silāmūn</i>	v / 12+n
TH02-T132	24 shekels of <i>ga-bi-a-nu</i>	for 1 <i>túg-nāsīsum</i> of market?	(via) servant of the lord	Expenditure (from the office of) <i>Silāmūn</i>	v / 14

All the records from *Silāmūn*’s office expose the ebb and flow of fabrics, daily wages of workers (some of which are connected to the activity of washing), and the products used for this washing activity. In several records concerning expenditures, the lord’s servant acts as an intermediary and probably as supervisor. Should we understand that the lord’s servant controlled work and distributed wages? When *ir lugal* is absent, as in all the ARM 19 texts, we can assume that the payment was made directly and not given to the lord’s servant. *Silāmūn*’s activities can be summarized by the scheme shown in Fig. 11.1.

The accounting of the administrative organization is probably monthly. This is suggested by tablets (TH02-T429b and TH02-T832) dated to the last day of the month, mentioning *šu nuštapḫir* / *šu iti* ‘what we have had collected, those (of this)

month'. The amounts recorded for guruš and oil, here qualified *zakûm* 'pure', could represent monthly expenses. In other words these records could be monthly accounts.⁷⁰

4.5. The price of clothes

The clothes delivered to the palace by Silāmun are probably those that were given to various individuals or to hosts/guests: ARM 19, 308 records the gift of a túg-bàr-gaba-ki by the palace to 'ammu-rāpi' via a scribe.

The túg-nāsisum šu lam-ki mentioned in tablets from Silāmum's office does not appear elsewhere. Other administrative archives quote only túg-nāsisum or túg-nāsisum šu sūnim (with stripes. These túg-nāsisum (šu sūnim⁷¹) are given by the palace as gifts or donations to individuals which mostly bear Amorite names: Igīd-Lîm;⁷² Amīnum,⁷³ Zakīrum⁷⁴ and Inūd-Lîm.⁷⁵ These tablets recording gifts and counter-gifts and citing túg-nāsisum belong to the archive 'présents somptuaires'.⁷⁶ We can differentiate between two types of records: those recording a gift and a 'counter-gift' (Type I) and those recording only a gift (Type II). In Type I, the gift is usually a few sheep with a value always lower than the counter-gift. The counter-gift of Type I and the gifts of Type II can be fine oil, shoes/sandals and clothes.

TH02-T55	
T502-T563s	
T602-T915, TH02-T144	
U12, 20, 31, 40, 41s	
T502-T512a	

In records from other offices we find sporadic mention of the value of clothes:

Ref.	Clothes	Value/price in silver			Key-word + administrator	Date
TH02-T995a	4 tóg	13 ⁷ shekels minus 30 ŠE	[for ? ...]	...	...	...
TH02-T542	3 tóg 1 tóg-bar-dul ₅	46 1/4 shekels	for the palace	[...] received	'Expenditure' (from the offices of) Ilum-gāmil and Ilak-alni	viii / 1
TH02-T845	2 (4?) tóg	17 shekels	for the palace	Iddin-Mamma received	Expenditure (from the offices of) Ilum-gāmil and Ilak-alni	ix / 2
TH02-T177	2 tóg	5 shekels and 12 ⁷ [ŠE]	for the palace	NP received	Expenditure (from the offices of) Ilum-turāya and Akka-Dayyān	viii / 23

Finally, a tablet discovered in sector F outside the palace at Mari records an inventory of the types of clothes classified according to their decreasing value. Only numeric values are mentioned; gín kù-babbar is implied. These clothes belong to Akka-dayyān, who may be the same person mentioned in table above (TH02-T177).

TH98-T147	
0.	
1. dī 30 10 ¹ 1/2 (shekels of silver)	
2. dī 10 1/2 (shekels of silver)	
3. dī 4 1/4 (shekels of silver)	
4. dī 4 1/4 (shekels of silver)	
5. dī 10 1/2 (shekels of silver)	
6. dī 3 (shekels) minus 30 (ŠE of silver)	
7. dī 3 1/2 (shekels of silver)	
8. dī 2 1/2 (shekels of silver)	
9. dī 1 1/2 (shekels of silver)	
r.	
10. dī 1 1/4 (shekels of silver)	
11. dī 1 1/4 (shekels of silver)	
12. dī 1 1/4 (shekels of silver)	
13. dī 1 1/4 (shekels of silver)	
14. dī 1 1/4 (shekels of silver)	
15. dī 1 1/4 (shekels of silver)	
16. dī 1 1/4 (shekels of silver)	
17. dī 1 1/4 (shekels of silver)	
18. dī 1 1/4 (shekels of silver)	
19. dī 1 1/4 (shekels of silver)	
20. dī 1 1/4 (shekels of silver)	
21. dī 1 1/4 (shekels of silver)	
22. dī 1 1/4 (shekels of silver)	
23. dī 1 1/4 (shekels of silver)	
24. dī 1 1/4 (shekels of silver)	
25. dī 1 1/4 (shekels of silver)	
26. dī 1 1/4 (shekels of silver)	
27. dī 1 1/4 (shekels of silver)	
28. dī 1 1/4 (shekels of silver)	
29. dī 1 1/4 (shekels of silver)	
30. dī 1 1/4 (shekels of silver)	
31. dī 1 1/4 (shekels of silver)	
32. dī 1 1/4 (shekels of silver)	
33. dī 1 1/4 (shekels of silver)	
34. dī 1 1/4 (shekels of silver)	
35. dī 1 1/4 (shekels of silver)	
36. dī 1 1/4 (shekels of silver)	
37. dī 1 1/4 (shekels of silver)	
38. dī 1 1/4 (shekels of silver)	
39. dī 1 1/4 (shekels of silver)	
40. dī 1 1/4 (shekels of silver)	
41. dī 1 1/4 (shekels of silver)	
42. dī 1 1/4 (shekels of silver)	
43. dī 1 1/4 (shekels of silver)	
44. dī 1 1/4 (shekels of silver)	
45. dī 1 1/4 (shekels of silver)	
46. dī 1 1/4 (shekels of silver)	
47. dī 1 1/4 (shekels of silver)	
48. dī 1 1/4 (shekels of silver)	
49. dī 1 1/4 (shekels of silver)	
50. dī 1 1/4 (shekels of silver)	
51. dī 1 1/4 (shekels of silver)	
52. dī 1 1/4 (shekels of silver)	
53. dī 1 1/4 (shekels of silver)	
54. dī 1 1/4 (shekels of silver)	
55. dī 1 1/4 (shekels of silver)	
56. dī 1 1/4 (shekels of silver)	
57. dī 1 1/4 (shekels of silver)	
58. dī 1 1/4 (shekels of silver)	
59. dī 1 1/4 (shekels of silver)	
60. dī 1 1/4 (shekels of silver)	
61. dī 1 1/4 (shekels of silver)	
62. dī 1 1/4 (shekels of silver)	
63. dī 1 1/4 (shekels of silver)	
64. dī 1 1/4 (shekels of silver)	
65. dī 1 1/4 (shekels of silver)	
66. dī 1 1/4 (shekels of silver)	
67. dī 1 1/4 (shekels of silver)	
68. dī 1 1/4 (shekels of silver)	
69. dī 1 1/4 (shekels of silver)	
70. dī 1 1/4 (shekels of silver)	
71. dī 1 1/4 (shekels of silver)	
72. dī 1 1/4 (shekels of silver)	
73. dī 1 1/4 (shekels of silver)	
74. dī 1 1/4 (shekels of silver)	
75. dī 1 1/4 (shekels of silver)	
76. dī 1 1/4 (shekels of silver)	
77. dī 1 1/4 (shekels of silver)	
78. dī 1 1/4 (shekels of silver)	
79. dī 1 1/4 (shekels of silver)	
80. dī 1 1/4 (shekels of silver)	
81. dī 1 1/4 (shekels of silver)	
82. dī 1 1/4 (shekels of silver)	
83. dī 1 1/4 (shekels of silver)	
84. dī 1 1/4 (shekels of silver)	
85. dī 1 1/4 (shekels of silver)	
86. dī 1 1/4 (shekels of silver)	
87. dī 1 1/4 (shekels of silver)	
88. dī 1 1/4 (shekels of silver)	
89. dī 1 1/4 (shekels of silver)	
90. dī 1 1/4 (shekels of silver)	
91. dī 1 1/4 (shekels of silver)	
92. dī 1 1/4 (shekels of silver)	
93. dī 1 1/4 (shekels of silver)	
94. dī 1 1/4 (shekels of silver)	
95. dī 1 1/4 (shekels of silver)	
96. dī 1 1/4 (shekels of silver)	
97. dī 1 1/4 (shekels of silver)	
98. dī 1 1/4 (shekels of silver)	
99. dī 1 1/4 (shekels of silver)	
100. dī 1 1/4 (shekels of silver)	

The *šakkanakku* texts recently discovered in Mari have brought to light new data on the wool economy. However, the content of these texts is laconic and they are fewer texts through which the *chaîne opératoire* can be restored than for Ur III. In the *šakkanakku* archives, we only have three texts concerning the early stages of the *chaîne opératoire*: namely plucking and wool processing performed by women. Some doubts remain about the interpretation of the word *nisKum* which could be either ‘top quality wool’ or ‘fabric’. According to the interpretation of this word, the operation it denotes varies and must be placed before or after weaving in the ‘*chaîne opératoire*’.

The organization of the *šakkanakku* texts by archive and theme has helped to

highlight a major point: that texts recording the output of women from office of Išma'-Akka could be bound to activities for the treatment of wool or weaving. Unfortunately, these records never mention the type of work for which the women workers received their salary. Various series of records show that the Silāmun's office was associated with washing or finishing clothes before they were sent to the palace. Therefore Silāmun's office appears at the end of *chaîne opératoire* of the production of fabrics. This is suggested by the deliveries of clothes to the palace from his office. From a technical point of view, these texts provide information on the quantities of *ga-bi-a-nu* and oil used to clean various fabrics and the labour assigned for this operation. Thus, we have new data about cleaning for comparison, in particular, with Ur III sources.

After finishing, the clothes can be subjected to various transactions, such as gifts by the palace to various individuals. These gifts could have different purposes, usually economic and/or diplomatic. The records of these gifts give us information about the values in silver of various fabrics.

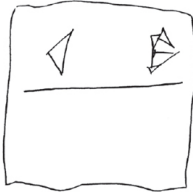
The *šakkanakku* texts allow us to glimpse at a part of the *chaîne opératoire* and to evaluate (carefully) the cost of production of textiles relative to their value, an aspect which cannot be understood without supplementing this information with that provided by comparisons with other textual sources.

Appendix 1. Texts of the é ninda-sum archive from ARM 19 and new texts (TH02)

ARM 19 (drawings H. Limet)

'Expenditures' (è-a) of (daily wages of) women

ARM 19, 15



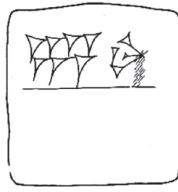
- o.1. 10 munus
- blank space



- r. blank space
- 2. è-a
- 3. é ninda-sum
- 4. 21 ud iti / e-bir₅-tin

TH02 (drawings L.C.I)

TH02-T163 (3,1 × 3,1 × 1,5 cm)



- o.1. 7 munus
- blank space



- r.2. è-a
- 3. é ninda-sum
- 4. 24 ud iti / kin

'Expenditures' (è-a) of bread (ninda)

ARM 19, 249

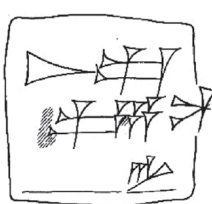
TH02-T360 (3.7 × 3.7 × 1.6 cm)



- o.1. 1(gur) 1bariga gur /
4bân ninda
l.e.2. blank space



- r.3. è-a
4. é ninda-sum
5. 11 ud iti /
e-bir₅-tin



- o.1. 1 gur
2bân 6 sila ninda
l.e.2. blank space



- r.3. è-a
4. é ninda-sum
5. 7 ud iti /
taš-ni-tin

'Check and receipt' (gûrum) of (daily wages of) women

ARM 19, 21

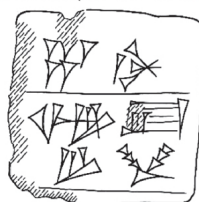
TH02-T82 (3.6 × 3.6 × 1.7 cm)



- o.1. 2 munus / sâ érin
2. gûrum(IGI+GAR) é /
ninda-sum



- r.3. blank space
4. 10 ud 'iti' /
kin |



- o.1. 5 munus
2. gûrum(IGI+GAR) é /
ninda-sum

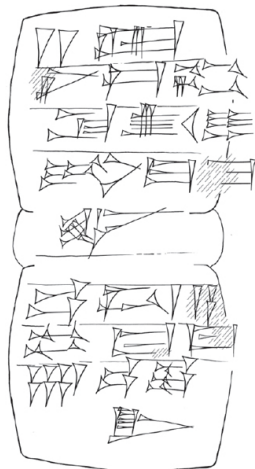


- r.3. blank space
4. 4 ud 'iti' /
'lâ-hi-im'

o. = obverse; r. = reverse; l. ed. = lower edge

Appendix 2. Texts referring to *nisKum*

TH02-T88 (3.9 × 3.7 × 1.8 cm)

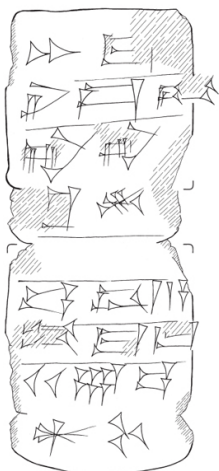


- o. and l. ed.
1. 2 gín
2. ni-is-Kum
3. si₄ ú ge₆
4. i-din-ma-'ma' / nar
r.
5. blank space
6. è-a
7. amar-ma-ma
8. 7 ud iti / kin

2 shekels
of *nisKum*
red and black,
(for) Iddin-Mamma, musician.

Expenditure (from the office of)
Būr-Mamma.
Day 7, month xii.

TH02-T853 (3.3 × 3.3 × 3.6 cm)



o. and l. ed.

1. 2 ma-[na]
2. *ni-is-Kum*^r
3. *BI-BI* / túg-du₈
- r.
4. blank space
5. è-a
6. amar-ma-ma
7. 27 ud [iti] / ^dkur

2 minas

of *niskum*,

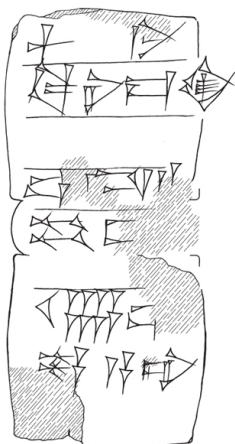
(to) Bibi, túg-du₈*.

Expenditure (from the office of)
Būr-Mamma.

Day 27, month vi.

* For the meaning of túg-du₈ see Steinkeller 1980 and Waetzoldt 2007.

TH02-T321 (3.5 × 3.4 × 1.6 cm)



o.

1. ½ 'munus'
2. *sá ni-is-Kín*(HUR)
3. blank space
4. 'è-a'
- l. ed. and r
5. amar-^rma'-[ma]
6. 18 'ud' / 'iti' a-bi

½ (daily wage of) woman
concerning *niskum*.

Expenditure (from the office of)

Būr-Mamma.

Day 18, month iv.



- 0.
1. 5 ma-na / 40 gín
2. *ni-is-Kum*
3. ki-lá-bi
- l. ed.
4. *sí-sí-/ik-tin*
- r.
5. šu 2 túg
6. *puzur₂-kak-kà*
7. im-ḫur
8. è-a
9. *de₄(TE)-rí-tum-ni-rí /*
nar-munus
10. 4 ud iti / ⁴da⁻gan¹

5 minas and 40 shekels
of *niskum*,
weight

of a fringe ;

(*niskum*) of two cloths;
Puzur-Kakka
received.
Expenditure (from the office of)
Dēritum-nīrī,
musician-woman.
Day 4, month viii.

TH02-T18 (4.7 × 4.7 × 1.8 cm)

- | | | |
|----|--|-----------------------------|
| o. | | |
| 1. | 1 ½ ma- ^r na ^ː / ni-is-Kum | 1 ½ mina of <i>niskum</i> , |
| 2. | ki ^ː -lá-bi | weight |
| 3. | sí-sí-ik-[tin] | of a fringe |
| 4. | ^r sa ^ː ^r túg ^ː [d]/dumu-zi | of a garment(of)-Dumu-zi; |
| r. | | |
| 5. | iš-má-a-ga | (from) Išma'-Akka |
| 6. | am- ^r hur ^ː | I received. |
| 7. | blank space | ----- |
| 8. | mu-qú-tum | <i>Deposit</i> . |
| 9. | 16 ud iti / a-bi | Day 16, month iv. |

TH02-T327 (3.4 × 3.7 × 2.6 cm)

- | | | |
|-----|---|----------------------------------|
| o. | | |
| 1. | [... / n ma-na] | ... n mina(s) |
| 2. | ^r ni ^ː -[is-Kum] | of <i>niskum</i> , |
| 3. | ^r šu ^ː [qab]- ^r li-Wa-tin ^ː | of 'middle parts' |
| 4. | ^r ki ^ː -lá- ^r bi ^ː | weight of |
| 5. | 4 túg-bàr-/gaba-ki | 4 clothes-bàr-gaba-ki; |
| r. | | |
| 6. | ir-ib-/ ^d da-gan | Ir'ib-Dagan |
| 7. | im- ^r hur | received. |
| 8. | blank space | ----- |
| 9. | è-a | Expenditure (from the office of) |
| 10. | iš-má-a-[ga] | Išma'-Akka. |
| 11. | 30 lá 1 ud [iti / MN] | Day 29, month ... |

TH02-T953 (4.2 × 4.0+ × 1.6 cm)

- | | | |
|-----|---|--------------------|
| o. | | |
| 1. | 5 ma- ^r na ^ː | 5 minas |
| 2. | ni-is- ^r Kum ^ː | of <i>niskum</i> , |
| 3. | šu qab-li-Wa-[tin] | of 'middle parts' |
| 4. | ki-lá- ^r bi ^ː | weight of |
| 5. | [...] | ... |
| | Lower edge and reverse are destroyed
(some traces of signs are visible on the reverse) | [...] |
| | upper edge | [Day n] |
| 1'. | níg ni-[sag] | month i. |

Appendix 3. Office of Išma'-Akka

TH02-T642 (3.6 × 3.5 × 1.7 cm)

- | | |
|---|--|
| <p>o.</p> <ol style="list-style-type: none"> 1. 95 1/3 munus 2. i-da-dingir 3. sá 2 r̄IB×3(diš)ṽ-túg / kiš-nitá r. 4. blank space 5. r̄è-a 6. iš-má-a-r̄gaṽ 7. 26 ud iti / ma-al-kà-ni-in₄ | <p>95 1/3 (daily wages of) women
(for) Ida-ilum
(daily wages for) 2 cloths-IB×3(diš) of the šakkanakku.</p> <p>-----</p> <p>Expenditure (from the office of)
Išma'-Akka.
Day 26, month ii.</p> |
|---|--|

TH02-T839 (3.3 × 3.2 × 1.5 cm)

- | | |
|---|---|
| <p>o.</p> <ol style="list-style-type: none"> 1. 4 munus 2. in érin 3. 1 munus 4. mar-ša-<at> r. 5. blank space 6. è-a 7. iš-má-a-r̄gaṽ 8. 4 ud iti / ^dkur | <p>4 (daily wages of) women
subject to the corvée,
1 (wage daily of) woman
'ill'.</p> <p>-----</p> <p>Expenditure (from the office of)
Išma'-Akka.
Day 4, month vi.</p> |
|---|---|

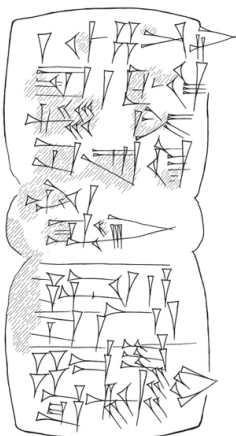
TH02-T438 (4.7 × 3.4+ × 2.1 cm)

- | | |
|--|---|
| <p>o and l.ed.</p> <p>[... / ni-is-Kum ?]</p> <ol style="list-style-type: none"> 1'. [ki]-lá-bi 2'. 1 túg ^d/r̄KIŠ².UNUG².GAL^ṽ r. 3'. iš-má-a-r̄gaṽ 4'. am-ḥur 5'. blank space 6'. mu-qú-tum 7'. r̄n ud itiṽ / [MN] | <p>[... / nisKum²]
weight of
1 garment-(of) Nergal²;</p> <p>(from) Išma'-Akka
I received.</p> <p>-----</p> <p>Deposit.
Day n, month</p> |
|--|---|

Appendix 4. Office of Silāmun

'Expenditure' (è-a) from the office of Silāmun: oil for garments/clothes

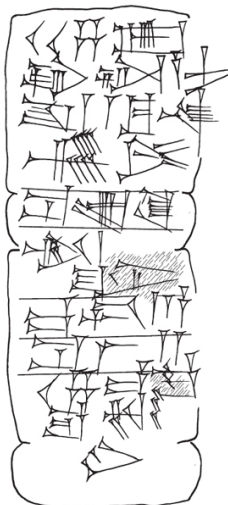
TH02-T79 (3.6 × 3.5 × 1.4 cm)



- | | |
|--|---|
| <p>o.</p> <ol style="list-style-type: none"> 1. 1 igi-4 silà ì 2. r̄iš 1 túg^ṽ-na-/r̄s̄f-sim₃(ZUM)^ṽ 3. r̄si lam^ṽ-ki l. ed. 4. r̄ir₁₁ṽ / lugal r. 5. blank space 6. r̄è-a 7. r̄s̄l-lá-min 8. 4 ud iti / e-bir₅-tin | <p>1 and ¼ litre of oil
for 1 cloth-nāsisum
of the market²,</p> <p>(issued to) the lord's servant.</p> <p>-----</p> <p>Expenditure (from the office of)
Silāmun.
Day 4, month v.</p> |
|--|---|

'Expenditure' (è-a) from the office of Silāmun: ga-bi-a-nu for garments/clothes

TH02-T132 (3.4 × 3.4 × 1.3 cm)



o.

1. 24 gín / *ga-bi-a-nu* /
iš 1 tūg-na-/si-sim₃(ZUM)

24 shekels of alkali? (alum?)
for 1 cloth-nāsisum

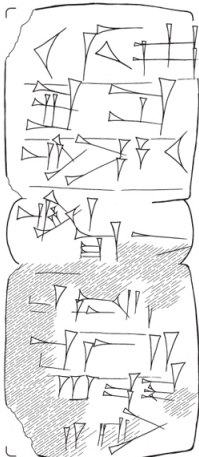
l. ed. and r.

2. si lam-ki
3. ir₁₁ lugal
4. è-a
5. si-lá-min
6. 14 ud iti / e-bir₃-tin

of the market?,
(issued to) the lord's servant.
Expenditure (from the office of)
Silāmun.
Day 14, month v.

'Expenditure' (è-a) from the office of Silāmun: (daily wages of) workers

TH02-T649 (3.4 × 3.6 × 1.7 cm)



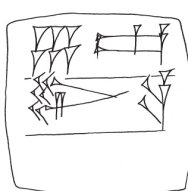
o. and l. ed.

1. 10 lá 1 guruš
2. ru-si
3. tim-sà-u
4. ir₁₁ lugal
- r.
5. 'è-a'
6. si-lá-min
7. [n+] 3 ud iti / 'a-bi'

9 (daily wages of) workers
dirty (wool/textile)
they cleaned,
(issued to) the lord's servant.

Expenditure (from the office of)
Silāmun.
Day n+3, month iv.

TH02-T377 (3.5 × 3.4 × 1.4 cm)



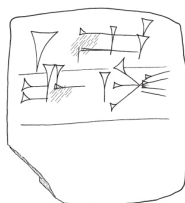
o.

1. 6 guruš
2. in érin
3. blank space
- r.
4. è-a
5. si-lá-min
6. 18 ud iti / e-bir₃-tin

6 (daily wages of) workers
subject to the corvée.

Expenditure (from the office of)
Silāmun.
Day 18, month v.

TH02-T404 (3.3 × 3.3 × 1.4 cm)



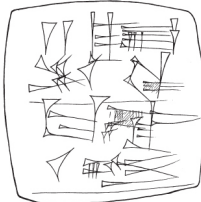
- o.
1. 1 ḡuruš⁷
2. *mar-šum*
3. blank space
r.
4. ḡè-a
5. *si-lá-min*
3. 20 ud iti / a-bi

1 (daily wage of) worker
'ill'.

Expenditure (from the office of)
Silāmun.
Day 20, month iv.

'Check and reception' (ḡurum) by Silāmun

TH02-T446 (3.4 × 3.4 × 1.6 cm)

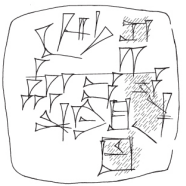
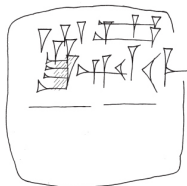


- o.
1. 2 tūg-bār-/gaba-ki
2. *ma-as-/u-tum*
3. blank space
r.
4. ḡurum *si-/lá-min*
5. 20 ud iti / ⁴ama-ki

2 cloth-bār-gaba-ki
washed.

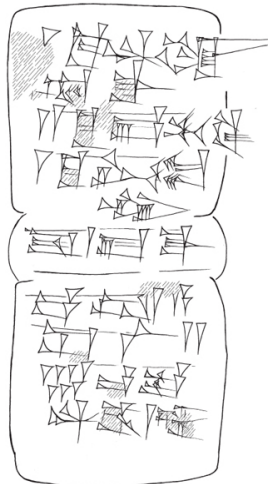
Control of Silāmun.
Day 20, month vii.

TH02-T221 (3.2 × 3.2 × 1.4 cm)



- o.
1. 5 guruš / šu DAL-lim* 5 (daily wages of) workers
2. blank space
r.
3. ḡurum ḡsī-/lá-min Control of Silāmun.
4. 5 ud iti / ⁴nin-ḡki-/tul₈ Day 5, month x.

TH02-T909 (3.8 × 3.8 × 1.7 cm)



- o. and l. ed.
1. 1 tūg-⁴KIŠ-/UNUG.GAL
2. 2 ḡtūg-bār-gaba-ki
3. 1 tūg-ku₈-tu-/mun
4. iš é-gal
5. blank space
r.
6. è-a
7. *si-lá-min*
8. 7 UD ITI / ⁴da-gan

1 cloth-Nergal,
2 cloth-bār-gaba-ki,
1 cloth-veil
for the palace.

Expenditure (from the office of)
Silāmun.
Day 7, month viii.

* For the meaning of DAL-lim see § 4.4.2.

mu-ḡú-tum-tablet concerning túg-nāsisum and workers

TH02-T63 (4.5 × 4.3 × 1.9 cm)



- o.
 1. 50³ guruš iš /
 1 túg-na-si-sim₃(ZUM)
 2. si lam-ki
 3. ir₁₁ lugal
 r.
 4. blank space
 5. mu-ḡú-tum
 6. 14 UD ITI / e³bir₃-tin³

50 (daily wages of) workers for
 1 cloth-nāsisum
 of market³,
 (from) the lord's servant.

 Deposit.

Day 14, month v.

The 'functioning of the administration'

TH02-T429b (4.0 × 3.1 × 1.8 cm)

- o. and l. ed.
 1. 24³ ½ GURUŠ³
 2. blank space
 3. [šu] nu³-uš-tap-/[hi-ir]
 4. [šu iti ?]
 r.
 5'. 2³-a
 6'. si³-lá-min³
 7'. 30 ud iti / im-ud,ud

24 ½ (daily wages of) workers,

that we did collect,
 [of (this) month ?].

Expenditure (from the office of)
 Silāmūn.
 Day 30, month xi.



- o.
1. 32 guruš
2. ½ sila i / za-kum
- l. ed. et r.
3. blank space
4. šu nu-uš-tap-/hi-ir
5. šu iti
6. è-a
7. si-lá-min
8. 30 ud iti / 'lá-^uhi-im

32 (daily wages of) workers,
½ litre of oil clear,

that we did collect,
of (this) month.
Expenditure (from the office of)
Silāmun.
Day 30, month iii.

Abbreviations

ARM Archives Royales de Mari (volumes d'édition/transcription)
 ARMT Aubert, O. (1977a)
 ARML Aubert, H. (1976)
 ARMD Duand, J.-M. (1983)
 ARMTupper, J.-R. (1983)
 BARBardet, G., Joannes, F., Lafont, B., Soubeyran, D. and Villard, P., (1984)
 ARMDuand, J.-M. (1983)
 ARMDuand, J.-M. (2009)
 LAPDuand, J.-M. (1997)
 CADChicago Assyrian Dictionary

Bibliography

- Bardet, G., Joannes, F., Lafont, B., Soubeyran, D. and Villard, P. (1984) *Archives administratives de Mari 1*, ARMT 23, Paris.
- Barjamovic, G., Hertel, T. and Larsen, M. T. (2012) *Ups and Downs at Kanesh. Chronology, History and Society in the Old Assyrian Period*, Old Assyrian Archives, Studies 5, Leiden.
- Biro, M. (1985) Les chroniques 'assyriennes' de Mari. *M.A.R.I.* 4, 219–242.
- Biga, M.-G. (2002) *Les foires d'après les archives d'Ebla*. Florilegium marianum 6. Mémoires de NABU 7, 277–288.
- Biga, M. G. (2010) Textiles in the Administrative Texts of the Royal Archives of Ebla (Syria, 24th Century BC) with Particular Emphasis on Colored Textiles. In C. Michel and M.-L. Nosch (eds), *Textiles Terminologies in the Ancient Near East and Mediterranean From the Third to the First Millennia BC.*, 146–172. Oxford
- Cavigneaux, A. and Colonna d'Istria, L. (2009) Les découvertes épigraphiques des fouilles récentes de Mari. État des recherches en janvier 2009. *Studia Orontica* VI, 55–68

- Cavigneaux, A. Colonna d'Istria, L. and Nicolet, G. (forthcoming) *Textes de l'époque des derniers šakkanakku de Mari*.
- Charpin, D. (2012) Mari à l'école d'Ešnunna: écriture, langue, formulaires. In C. Mittermayer and S. Ecklin (eds), *Altorientalische Studien zu Ehren von Pascal Attinger*, mu-ni u₄-ul-li₂-a-aš ġa₂-ġa₂-de₃). OBO 256, 119–137.
- Charpin, D. and Ziegler, N. (2003) *Mari et le Proche-Orient à l'époque amorrite*². essai d'histoire politique. *Florilegium marianum* 5. Mémoires de NABU 6. Paris.
- Civil, M. (2008) *The Early Dynastic Practical Vocabulary A (Archaic Har-ra A)*. ARES IV. Rome.
- Colonna d'Istria, L. (2011a) ARM XIX: la séquence SI.LA₂ 2 = *si-la-mîn* (NP) et quelques relectures de noms propres. NABU. 2011 n°4, 92–93.
- Colonna d'Istria, L. (2011b) Pièces tissées et musiciens: à propos d'ARM 19 321. NABU 2011 no. 4, 94.
- Durand, J.-M. (1983) *Textes administratifs des salles 134 et 160 du palais de Mari*. ARMT 21. Paris.
- Durand, J.-M. (1984a) Un parallèle de Mari pour un document médio-assyrien. *M.A.R.I.* 3. 266–268.
- Durand, J.-M. (1984b) A propos du nombre 10 000, à Mari. *M.A.R.I.* 3, 278–279.
- Durand, J.-M. (1985) La situation historique des Šakkanakku: nouvelle approche. *M.A.R.I.* 4, 147–172.
- Durand, J.-M. (1988) *Archives épistolaires de Mari*. ARMT 26/1. Paris.
- Durand, J.-M. (1992) Unité et diversité au Proche-Orient à l'époque Amorrite. *CRRAI* 38, 97–128.
- Durand, J.-M. (1997) *Documents épistolaires du palais de Mari* I. LAPO 16. Paris.
- Durand, J.-M. (2006) Chronique du Moyen-Euphrate 6. Mesures mariotes avant la babylonisation de l'écriture. *Revue d'assyriologie et d'archéologie orientale* 100, 97–99.
- Durand, J.-M. (2008) La religion amorrite en Syrie à l'époque des archives de Mari. In G. Del Olmo Lete (ed.), *Mythologie et religion des Sémites Occidentaux. Volume 1: Ebla, Mari*. OLA 162. Leuven, 163–716.
- Durand, J.-M. (2009) *La nomenclature des habits et des textiles dans les textes de Mari*. Matériaux pour le Dictionnaire de Babylonien de Paris 1, ARMT 30, Paris.
- Eidem, J. (1994) Raiders of the Lost Treasure of Samsi-Addu (text no. 116). In D. Charpin and J.-M. Durand (eds), *Florilegium marianum II. Recueil d'études à la mémoire de Maurice Birot*, 201–208.
- Firth, R. (2012) Considering the Finishing of Textiles Based on Neo-Sumerian Inscriptions from Girsu. In M.-L. Nosch, H. Koefoed and E. Andersson Strand (eds), *Textile Production and Consumption in the Ancient Near East (Archaeology, Epigraphy, Iconography)*, 140–160. Oxford.
- Gelb, I. J. (1965) On the Recently Published Economic Texts from Mari. *Revue d'assyriologie et d'archéologie orientale* 50, 1–10.
- Gelb, I. J. (1987) The Language of Ebla in the Light of the Sources From Ebla, Mari, and Babylonia. In L. Cagni (ed.), *Ebla 1975–1985, Dieci anni di studi linguistici e filologici*, Atti del convegno internazionale (Napoli, 9–11 ottobre 1985), 49–74.
- Kupper, J.-R. (1983) *Documents administratifs de la salle 135 du palais de Mari*, ARMT 22, Paris.
- Limet, H. (1975) Observations sur la grammaire des anciennes tablettes de Mari. *Syria* 52, 37–52.
- Limet, H. (1976) *Textes Administratifs de l'époque des Šakkanakku*, ARM XIX, Paris.
- Lackenbacher, S. (1982) Un texte vieux-babylonien sur la finition des textiles. *Syria* 59, 129–149.
- Margueron, J.-Cl. (forthcoming) Mari: Rapport préliminaire sur la 38e campagne (2002). In *Akh Purattim* 3.
- Rouault, O. (1977a) *Mukannišum L'administration et l'économie palatiales à Mari*. ARM XVIII. Paris.
- Rouault, O. (1977b) L'approvisionnement et la circulation de la laine à Mari d'après une nouvelle lettre du roi à Mukannišum. *Iraq* 39, 147–153.
- Steinkeller, P. (1980) Mattresses and Felt in Early Mesopotamia. *Oriens Antiquus* XIX, 79–100.
- Waetzoldt, H. (1972) *Untersuchungen zur neusumerischen Textilindustrie*. Roma.
- Waetzoldt, H. (2007) The Use of Wool for Production of Strings, Ropes, Braided Mats, and Similar Fabrics. In C. Gillis and M.-L. Nosch (eds), *Ancient Textiles, Production, Craft and Society*, 112–121.
- Westenholz A. (1978) Some Notes on the Orthography and Grammar of the Recently Published Texts from Mari. *BiOr* 35, 160–169.

1 This communication is a preliminary publication of some šakkanakku-texts discovered in Mari during

recent excavations (2002). A complete publication of the *šakkanakku*-texts discovered in Mari during the 2001–2003 excavations is being finalized under the direction of Prof. Antoine Cavigneaux, assisted by Grégoire Nicolet and myself. My thanks go first to Antoine Cavigneaux and Grégoire Nicolet who allowed me to publish some texts in this paper. I also thank Jean-Claude Margueron, who has given us the field's data concerning these tablets. Finally, I would like to express my gratitude to Cécile Michel and Catherine Breniquet for their reading of this paper and to Richard Firth for his remarks and for correcting my English.

2 Charpin 2012.

3 Charpin and Ziegler 2003.

4 Margueron (forthcoming).

5 All these texts will be published in Cavigneaux, Colonna d'Istria and Nicolet, forthcoming.

6 Limet 1976.

7 The administrative key-word *gúrum* (IGI + GAR), literally 'to control, inspect', suggests receipt by the official who is named after the key-word *gúrum*.

8 The sequence *é ninda-sum* was previously read by H. Limet (1976) *é-níg-gad_x* following I. J. Gelb (1956, 8). The last sign of the sequence is probably a local writing of the sign SUM (this reading was suggested to me by J.-M. Durand, oral communication). The *é ninda-sum* should probably be an office's place (may be in the palace?). The exact meaning eludes us, we have decided to read *ninda* instead of *níg* because this office oversees the expenditure of bread (*ninda*), (wages of) women and its receipts (wage of) women and barley (*še*). The sign SUM could also be read SIG₁₀, but nothing suggests it.

9 See Appendix 1.

10 ARM 19, 1–15, and ARM 19, 17.

11 ARM 19, 65.

12 ARM 19, 249; ARM 19, 250.

13 ARM 19, 21. For *érin* see Gelb 1987.

14 Although the account ARM 19, 218 does not belong to the archive of the *é ninda-sum*, this account records expenditures of flour from the office of Zanabum which the *é ninda-sum* is among the recipients.

15 TH02-T694: 0-(1) *āš-tu-ma* (2) 28 *uḍ* iti / *a-bi* (3) *dingr-ga-i* (4) *en-ti-ni* r. (5) *tá-à-ni-¹iš* (6) blank space (7) [è].- a (8) [*é ninda*]- sum . This text begins with the preposition *āš-tu-ma* used in temporal context: *āš-tu-ma* x *uḍ* iti y 'since the x days of the month y'. Administrative notices beginning with the preposition *āštūma* are found in ARM 19, see no. 428: read *āš-tu-ma* instead of 5bān *tu-x*, but unfortunately the end of the obverse is partially broken, and thus we do not know which administrative operation it records. Among the new texts, four administrative notices begin with *āštūma* (TH02-T455, TH02-T574f, TH02-T766i, TH02-T906a), but these texts are very fragmentary. The date formula (x *uḍ* iti MN) is not present at the end of any of these documents as it used to be in other types of administrative records.

16 Colonna d'Istria 2011a.

17 ARM 19, 110; ARM 19, 290. See also Cavigneaux and Colonna d'Istria 2009, 55.

18 For example see Colonna d'Istria 2011b.

19 Durand 1985. This chronological anchor is based on the following facts:

- the mention of Yağid-Lîm (*i-ki-id-li-im*) in ARM 19, 205, being probably the father of Yaḥdun-Lîm
- the mention of Ila-kabkabû (*il-e-kab-ka-bu*) in ARM 19, 338, being probably the father Samsi-Addu.
- the document ARM 19, 463 according to the historical model of J.-M. Durand would indicate the transfer of capital from Šuprum to Mari by Yaḥdun-Lîm, implying a date shortly before the writing reform.
- the existence of duplicates written according to the *šakkanakku* style and to the 'post-reform' system (T.518 and T.519).

20 Durand 2006. The text M.19124, written in the *šakkanakku* style, shows some advanced features compared to the records of ARM 19 and TH02. The persons named in M.19124 do not seem documented in ARM 19. This record can be dated just before the writing reform during the time of Yaḥdun-Lîm.

21 Cavigneaux and Colonna d'Istria 2009, 62–64.

22 Cavigneaux and Colonna d'Istria 2009, 62–64.

23 A.3006, see Charpin and Ziegler 2003, 43: (5) *lú-meš lu-ul-lu-ú mu-ga-al-li-[lu]* (6) *1-šu i-na tu-ut-[t]u-[u]*^{lki} (7) *ú-ga-al-li-lu* (8) *ša-[n]i-iš i-nu-ma a-mi-nim ša-al-ši-iš i-nu-ma a^utu-ši-^uim* (9) *ri-[b]i-iš i-nu-ma ia-aḥ-du-li-im ú-ga-al-li-lu* (10) *i-na-[an-n]a lú lu-ul-lu-ú-meš* (11) *an-nu-[tum] gu-ul-lu-lam* (12) *ú-ul i-ḥa-aṭ-tú-ú*.

24 Barjamovic, Hertel and Larsen 2012, 32, 94.

25 This death of Aminum is also commemorated by a year name on a document from Šaduppum

discovered in level III dating from around the mid-19th century. Birot 1985, 223, note 21, see KRAUS 1949, 143 no. 2: year name MU *ia-mi-ni ba-ús*.

26 For other lexicographical features of *šakkanakku*-texts see Westenholz 1977, Durand 1984b, Durand 1985, Durand 2006, Cavigneaux and Colonna d'Istria 2009. In addition to the lexicographical particularities, the *šakkanakku*-texts mention logograms whose use were abandoned after the writing reform, for example: administrative key-words è-a 'expenditure' and gürum 'control'; lak-20 (megida) 'goat', ga-eš₈ 'merchant', SAG × TAK₄ 'gatekeeper', and ÍB × 3(diš) 'type of cloth'.

27 TH02-T755 : o. (1)2 [udu gal?] (2)1 [udu] (3)2 [silā₄] (4)1 máš-nita (5) blank space (6) šunigin [6 udu- udu] r. (7) è -[al (8) zī-zā -[nim] (9) 2 [...] - tum (10) 2 [é 'da]-gan (11)1 [é 'nin-é]-gal (12)1 [...] (13) 2 + n [ud iti] / e-[birš-tin] : 2 old sheep?, 1 sheep, 2 lambs, 1 male goat: Total 6 sheep. Expenditure (from the office) of Zizānum. 2 (sheep for) ...-tum, 2 (sheep for) the temple of Dagan, 1 (sheep for) the temple of Bēlet-ekallim, 1 (sheep for) ... Day 2+, month v. However the practice of graphic duplication to note the plural is not a systematic, udu be found with the meaning 'various types of sheep': TH02-T907: o. (1)2 udu gal (2)1 udu- munus (3)1 [kab-šum] (4)1 lak 20 (MEGIDA) (5)2 ú-ra-šú r. (6) šunigin 7 udu / {x} sanga (7) šu i-lī-bi (8) gürum im-līk-é-a (9)10 ud iti / e-birš-tin: 2 old sheep, 1 ewe, 1 young ram, 1 (male) goat, 2 kids. Total: 7 sheep (for the) sanga(-priest) from Ilibi. Control of Imlik-Ea. Day 10, month v.

28 For example ARM 21, 3

29 For example ARM 22, 293

30 For example T.255 and T.214 dated to month xii (iti apin-du₈) during Yaḥdun-Līm's reign, see Durand 1984a; Charpin and Ziegler 2003, 20; see also the texts dated to Zimri-Līm's reign (month xii = iti e-bu-ri-im): ARM 9, 35. ARM 23, 373, Durand 2009, 265 [M.6032].

31 Waetzoldt 1972, 17–23.

32 Durand 2009, 15.

33 About the different qualities of wool cited in the texts Mari dated to the Amorite period see Durand 2009, 14–16.

34 Waetzoldt 1972, 45–51.

35 Limet 1976, 17 proposes to understand this term as the legal term *muquttūm*, derived from *maqātum* 'fall, drop' and known in Neo-Babylonian. He translates as follows: 'ce qui tombe complètement dans une forme déterminée'. But the CAD notes that this proposal may not be accurate insofar as *muquttūm* is formed on the word pattern C₁u₂u₃C₃a₄-um and cannot match with *MU-KU-TUM* according to the *šakkanakku* orthographic conventions. CAD M., p. 214 therefore provides: "In the context of thesis adm. texts, a mng.: such as 'delivery' 'arrival' (opposed to è-a PN or è-a é ... 'expenditure from PN' or 'expenditure from a storehouse') seems considers". Indeed, when *MU-KU-TUM* and è-a are preceded by the verb *maḥārum* 'receive', *MU-KU-TUM* follows *am-ḥur* 'I received' while è-a follows *im-ḥur* 'he received' (See ARM 19, 326; ARM 19, 327; ARM 19, 329–339). It is still possible that this term derives from the verb *maqātum* (root MQT). Indeed, verbal *maqātum* basis, according to the CAD, has significantly different meanings in different contexts, including the 'arrival of persons or goods' (CAD M, *maqātum* 3a p. 246–247). In the documentation of Old Assyrian merchants such use is well documented. CCT 4 49a:4–6, kù-babbar 10 ma-na iš-tù bu-ru-uš-/ḥa-tim, im-qú-ta-ma i-na é be-tí-/kà, i-ba-ší, "silver, 10 minas, since Burušhattum has arrived and it is in your house". The meaning of 'arrival' or 'deposit' given in this case to the verbal base *maqātum* should fairly well with previous observations, that *MU-KU-TUM* acts as a key expression with *am-ḥur* and not with *im-ḥur*. Because of spelling, *mu-Ku-tum*, could be a form *purūsum/maqūtum*/.

36 See Michel in this volume.

37 Durand 2009, 145.

38 Durand 1997, 274–275 (*editio princeps* Rouault 1977b) ; Durand 2009, 30 : (39)túg šú-ú ki-ma túg tu-tu-tu-bé-e šu-ta-a-am (40)ù bi-it-ta-am dam-qī-š lu-ú na-sí-ik (41)ù lu-<ú> ka-ší-ir 'Cette étoffe doit être bellement tissée et nouée, trame et chaîne, comme une étoffe de Tuttub'. Durand 2009, 145.

39 Lackenbacher 1982, 141.

40 For example M.6706 (Durand 2009, 463).

41 Durand 2009, 145.

42 Durand 1985, 161.

43 This cloth's name must be a sequence of logograms because it does not vary with the number and case. The reading *pār-sik₁₀-(ŠI)-ki* proposed by Durand 2009, 78, does not seem appropriate.

44 About the meaning and activities of túg-du₈ see Steinkeller 1980, 85–93 see also Waetzoldt 2007 who has argued (contra Steinkeller) that túg-du₈ is not a 'felter'.

45 ARM 18, 30: o. (1) a-na mu-ka-an-ni-ši-im (2) qí -bí-ma (3) um -ma ma-ap-ra-kum-ma (4) ra-im-ka-a-ma (5)10 gin du-lu-š-ši-im (6)3 ma-na si-g-ḥi-a (7) 2/3 ma-na ḥa-wu-ra-tam l. ed. (8)ù 10 gin na₄ ga-b[i-i]m (9) a-na iš-ka- ar r. (10) I da-ni-dingir lú-túg-du₈ (11) a-na ši-pí-ir (12) ḥu-ul-li ù ap-pa-tim (13) šu-bi-la-

am (14) lú šu-ú la i-ri-iq. Durand 1997, 269–270.

46 Colonna d'Istria 2011b.

47 Durand 2009, 86.

48 Durand 2009, 53.

49 Durand 2009, 120, reads: 10 ma-na 40 su sig / ša šu-tu-ia (WA)-tin ša tóg šagin / [š]u sig NP i-ti-na-šu “laine devant constituer le tissage de l’habit du roi (de Mari) dans la laine que NP lui a fournie”. In the *šakkanakku*-texts, the verb *nadānum* ‘to give’ is not found in this form. We should have instead *i-din-šum/iddinšum* / ‘he gave him’ (well known: ARM 19 308: TH02-T171, see Cavigneaux and Colonna d'Istria 2009, 64). Instead of NP *i-ti-na-šu* we must keep the reading of H. Limet: *ì-lì-i-ti-na-šu*. This personal name with the same spelling is also known in TH02-T200 and in the cylinder-seal M.4081.

50 For the type of cloth see Civil 2008, 93; Biga 2010, 158–159.

51 About the reading *si-lá-mîn* as a personal name instead of *si-lá* 2 see Colonna d'Istria, 2011a.

52 For a discussion about this cloth see Durand 2009, 76.

53 This sequence can be analyzed in two ways. The sequence lam-ki could be the inversed spelling of ki-lam ‘market’. This graphic inversion can be found in the pre-Sargonic texts from Ebla: lam₇-ki (and lam:ki in older texts) may be the equivalent of ki-lam ‘market’ (see Biga 2002). Durand 2009, 76, proposes an alternative interpretation of the sequence lam-ki. He reads *iš* -ki which means ‘sexual parts of man’. His proposal is based in part on the connection of the sequence *nāsisum šu iški* with equivalence *na-si-iš-tum* = *na-aḫ-lap-tú ú-ri* (*naḫlaptu ūri*) cited in *maliku-šarru* VI 125. This term is also known in Ugaritic ‘*ušk*. It should be emphasized that the proposed reading is consistent with the use of sign *iš*₁₂ (lam) which represents /iš/ (as in TH02-T496 +, l. 19.: *ni-iš₁₂ be-al qá-qá-rī-im*) while the sign *iš* represents rather/(y)iš/. However, three documents appear to show that reading *šu iš₁₂ -ki* does not seem appropriate: TH02-T214 shows that *nāsisum šu lam-ki* can be a type of carpet (*ḥa-u*) ; TH02-T63 and TH02-T937 + respectively record the allocation of 50 and 40 (daily wages of) workers for one *nāsisum šu lam-ki* (see *infra*).

54 In the *šakkanakku* system, the logogram lugal is probably used for *bēlum*, see for example the divine name: *ḏugal-ma-tin* = *be-el-ma-tin*; see Durand 1985, 162 and Durand 2008, 198, 203–204.

55 The keyword and the name of the official on the reverse of this text are lost. However, the signs as well as the shape of the tablet suggest that this text comes from the archive recording Silāmun’s work.

56 For a discussion about this type of cloth, see Durand 1983,466 (note n°19) and Durand 2009, 115.

57 Limet 1976, 35.

58 The identification of activity of Silāmun’s office is based on some evidences: the checking and reception of washed textiles (*túg mašḫum/mašḫutum*) by Silāmun and expenditures from Silāmun’s office of (daily wages of) workers assigned to cleaning (*rūši yimsaḥ(ā) / timsaḫū*)(see *infra*). If *ga-bi-a-nu* is indeed the term for ‘alum’, the Silāmun’s activity could be dyeing. In this case, *masāḫum* couldn’t be the verb ‘wash/clean’.

59 For example ARM 23 145, ARM 23, 165, ARM 23 168.

60 Waetzold 1972, 172.

61 ARM 19, 330: o. (1) 20 gín / *ga-bi-a-nu* (2) *iš* bad-túg (3) *ḏIM*-ni-ri (4) *am-ḥur* r.(5) blank space (6) *mu-qú-tum* (7) 6 ud iti / *e-bir₅-tin*. The mention of this type of clothing (or fabric) in the *šakkanakku*-texts is unique. The reading of the first sign may be not sure: from the Ur III period, the signs TIL and BAD tend to be conflated. It is possible that bad-túg may be a graphic simplification from BAD.AŠ-túg. (*zara₆-túg*) known in the pre-Sargonic texts (for this type of clothing see Civil 2008, 92–93, Biga 2010, 161). The writing of the cloth bad-túg cited in *šakkanakku*-texts can be compared with *túg-bad* known in two Old Babylonian UR₅-ra = *ḫubullum* (forerunner) list.

62 For this expression see Westenholz 1978, 164, 167–168. See also CAD R (1999), 432, *rūšA* “filth, dirt”: 1 GURUŠ *ru-si imsa’a* E.A – disbursement: one man, he washed the dirty (garments?).

63 It could be possible to make a connection with *šabum gibētum* which means ‘army assembled and ready’ known in Amorite texts (see ARM 26/1, 160 and Eidem 1994, 208 note 1).

64 The ratios of materials per cloth can be compared to the Ur III sources, see Firth 2012.

65 Durand 2009, 42–44.

66 Westenholz 1978, 163.

67 Bardet, Joannes, Lafont, Soubeyran, and Villard 1984, 583.

68 Catherine Breniquet brought to my attention the representation, on the black obelisk of Salmanazar III, of two men carrying clothes on a pole.

69 TH02-T397: (1) 10 má-[lah₄] / *šu* DAL-lim (2) *šu* pá-ḥa-a / *giš*má-*giš*má.

70 We find this expression *šu nuštapḫir* / *šu iti* ‘whatever the administrative key-word (è-a and gurun),

TH02-T459: o. and l. ed.. (1). *20^o lá 1 guruš* (2). *šu nu-uš-/tap-ḫi-ir* (3). *šu iti r.* (4). *gurun ir-ir* / *bum* (5) 30 ud iti / im-ud.ud.

71 For *sūnum* see Durand 2009, 95.

72 TH02-T171 (Cavigneaux and Colonna d'Istria 2009,64).

73 TH02-T144 (Cavigneaux and Colonna d'Istria 2009,64).

74 TH02-T20 (Cavigneaux and Colonna d'Istria 2009,64).

75 TH02-T197: o. (1)1 [┐]túg[┐]-na-si-súm / šu sú-nim (2)13 gín sa₁₀-šu (3)i-nu-ud-/li-im r. (4)ki-bir₅-é-a / nar (5)u-bil-šum (6) blank space (7)8 ud iti / e-bir₅-tin.

76 Cavigneaux and Colonna d'Istria 2009, 62–64. The writing of these texts is more careful and they use specific terminology: the gift is *wabālum* ‘carry’ or *nadānum* ‘give’ to the beneficiaries by another person named and qualified by his position (dub-sar, nar, aga-uš-šu) . The use of these two verbs suggests two different situations: it may be that the verb *nadānum* ‘to give’ is used when the recipient is present in the palace (or in the city), while the *wabālum* verb ‘to carry’ would be used when the recipient is outside the palace (or outside the city).

12. All Wool and a Yard Wide. Wool Production and Trade in Old Babylonian Sippar

Katrien De Graef

As many documents from the Old Babylonian period show, wool was one of the basic commodities in that society, alongside barley, beer and oil: workers were allotted wool in ration lists, individuals asked for wool to make clothing in letters, quantities of wool were part of gifts between individuals, etc.¹

In this paper, I would like to focus on wool production and especially wool trade in late Old Babylonian Sippar. In 1982, D. Charpin described the wool trade in the late Old Babylonian period in his splendid article ‘Marchands du palais et du temple à Babylone à la fin de la Ière dynastie de Babylone’.² Based on Old Babylonian letters and economic documents, mainly from Sippar, he reconstituted the different transactions in the palace wool trade from the plucking of the sheep and the delivery of the wool by the palace scribe (and later *abi šābim*) Utul-Ištar to intermediaries in Babylon, through the transport to other cities such as Sippar and commercialisation of the wool by the intermediaries by means of credit sales to private individuals, to the reimbursement in silver to the palace.

As the Šamaš temple in Sippar sold wool in the same way, Charpin concluded that the palace did not exercise a monopoly on wool production and trade, and that a fixed equivalency between wool and silver did not exist in this period.

Subsequently, new texts from Sippar have come to light that make it possible to modify Charpin’s model in the light of new evidence. In this paper I will thus reappraise palace wool production and trade in the Old Babylonian period, presenting some recently published and unpublished texts from Sippar, in order to complete Charpin’s model.

1. Charpin’s model in a nutshell

Before going any further, let us consider Charpin’s 1982 model and some comments on it made by Van De Mieroop in his contribution, ‘Credit as a Facilitator of Exchange in Old Babylonian Mesopotamia’.³

Charpin’s model consists of five phases in which the commercialisation of wool from the palace flocks is described.

During the first phase, which is primarily attested in letters, the herdsmen responsible for the palace flocks are summoned by the king to bring in their sheep to be plucked in Babylon. There are 6 letters by king Ammišaduqa⁴ in which he

states that the plucking of the sheep will take place in the *bīt akītim* in due time and that the addressee is asked to organize the transport of the sheep he herds, to bring the receipts of the sheep he booked as losses and to come to Babylon within the set term. The sheep were plucked at the end of the winter⁶ after which huge amounts of wool were received, weighed, bundled and sealed by the responsible official in the *bīt akītim* in Babylon, ready to be apportioned to the so-called intermediaries.⁷

Indeed, the palace had herds of cattle, sheep and goats, owned landed estates with fields and orchards and controlled waterways and marshes in which fish was caught. The exploitation of these resources was primarily done through a system of sharecropping: herdsmen, farmers and fishermen took care of the daily duties in return for a share of the proceeds. As the palace was paid only with the produce obtained by their sharecroppers, it was faced with an abundance of perishable goods beyond their own direct needs. In order to convert the surplus into easily storable silver, a system was developed using entrepreneurs as intermediaries: they arranged the contacts between the palace and the consumers.⁸

Van De Mieroop argued that there was not just one *bīt akītim* in Babylon,⁹ as Charpin thought, but that there existed probably many of these buildings throughout the country which represented the palace's collection centres for wool. This is very practical reasoning, as indeed it seems a bit strange that palace flocks, that were being herded in the vicinity of Sippar, would have to be brought to Babylon (about 60 km) to be plucked after which both the wool and the animals were supposed to return to Sippar. However, the letters are quite clear in stating that the sheep must be moved to Babylon¹⁰ and we do not know of any other institutional building called *bīt akītim* apart from the one outside Babylon. Thus, it seems that all flocks of the palace, wherever they were being herded, were plucked at a central location in Babylon. No doubt this was in order to exert a centralized control over the number of sheep – as documents concerning the losses had to be provided too – and the weighing, bundling and sealing of the wool before it was given to the intermediaries for trading.

During the second phase, the wool in Babylon was delivered to the intermediaries. None of the texts illustrate this phase directly. This is obvious, as these tablets would have been kept in the archives of the palace in Babylon, of which the Old Babylonian levels cannot be excavated as they are situated under the water table. However, this phase is attested indirectly in the letters mentioned for the first phase, in which it is said that wool is ready to be apportioned to the merchants (cf. *supra*), as well as in the credit sales and reimbursement documents from which we learn that the wool lent out to individuals by Ilšu-ibni, the overseer of the merchants in Sippar-Jahrūrum was received by him in the palace (cf. *infra*).

During the third phase, the palace wool was traded by the intermediaries who passed it on for distribution to private individuals. This was done through what is usually called 'credit sales': loan documents in which amounts of palace wool are lent to individuals who have to pay the loan back in silver, in fact loan documents that were used as contracts for the transfer of goods.

In his overview, Charpin mentions eleven of these credit sales, dating from Ad 23 to Aš 2,¹¹ which were of three kinds: (1) nine out of the eleven of these were credit sales, at a set price that had to be paid back when claimed (BM 80636, BM 80644, BM 80422, CT 8, 36a, BDHP 19, CT 8, 11c, CT 48, 119, CT 8, 21a and CT

8, 30b), (2) one was a credit sale at a set price that had to be paid back within a set period (CT 6, 35c), and (3) one was a credit sale to be paid back when claimed at the price of the day (CT 6, 37c). All but one of these credit sales were to be paid back when the palace claimed its silver, which could be, as we know from letters and reimbursement documents, several years later (cf. *infra*). The long time span between loan and reimbursement was necessary as the recipients of the wool needed to be able to market it through a series of smaller transactions, as Van De Mieroop has already noted.¹² One credit sale (CT 6, 35c) was to be paid back to the bearer of his tablet within a period of two months. A twelfth document, BM 81591, a credit sale to be paid back to the bearer of his tablet when claimed, the transcription of which is published by Charpin in the same article,¹³ should be added to this. In all, for his 1982 study, Charpin had twelve wool loan documents or credit sales at his disposal.

We now have a total of twenty-six palace wool loan documents at our disposal: eleven of which are to be paid back to the palace when claimed;¹⁴ twelve of which are to be paid back within a set period to the bearer of his tablet (*ana naši kanikišu*) in silver or barley;¹⁵ two of which are to be paid back to the bearer of his tablet when the palace claims the silver;¹⁶ and one of which is broken and can therefore not be attributed to one of these categories.¹⁷ These new documents make it possible to modify the existing model and I will return to these below.

During the fourth phase, the private individuals paid their debts to the intermediaries. Only two of these reimbursement documents have been preserved, one of which can be linked to a credit sale: *BDHP* 30, dated Aš 15-vi-18, states that Marduk-mušallim, Ilšu-ibni and the sons of Nūr-Šamaš paid 5 shekels of silver, part of the price of 1 talent of palace wool for which Utul-Ištar was responsible and that they received in Aš 13 from Išme-Sîn, son of Sîn-bêl-aplim. The original sale credit is CT 8, 21a, dated Aš 13-iv-20, in which they received 1 talent of wool, worth 10 shekels of silver from Išme-Sîn, to be paid back on the day the attendant of the palace will call. These documents show that the creditors did not pay back to the courier (*na-aš-bar*) of the palace¹⁸ directly, as indicated in the original loan document, but to the intermediary from which they received the wool. We also learn that they paid only the first half of the amount due almost two years later. As the other reimbursement document, CT 33, 31, dated Ad 31-v-07 does not mention the time the wool was originally received, we cannot know whether all debtors were so late. It is certain though that the reimbursement by the intermediaries to the palace did not always go smoothly, as we know from the letters,¹⁹ they frequently did not comply immediately with the palace's request, which might of course have been caused by the debtors lingering with their payments.

During the fifth and final phase, the intermediaries paid the silver to the palace. Three records attest this phase. Two of them, BM 80997 (Ad 23-ix-08)²⁰ and BM 80905 (Ad 23-xii-19)²¹ recording that Ilšu-ibni, overseer of the merchants of Sippar, delivered refined silver as part of the price of the wool, cattle and sesame that were under his responsibility. The receiving party is not mentioned, but the presence of a religious seal may point in the direction of a high palace official. However, as these tablets were found in Sippar, they must have been some kind of proof of payment from the palace administration kept by Ilšu-ibni for his own records. It goes without saying that the palace administration in Babylon also kept

records of the reimbursements by the intermediaries. The third document, CT 48, 72 (Ad 30–x–25) attests to the reimbursement of a total amount of 15 minas of silver by the judge Utu-šumundib, son and later successor of Ilšu-ibni, and Eṭirum, son of Saniq-pi-Šamaš, from the *kārum* of Sippar-Jahrūrum, part of the price of the wool, cattle and sesame that were under their responsibility. The text specifies that this payment is the residual payment from Ad year 24 and a part of Ad year 25, which proves that in some cases the palace had to wait for more than 5 years to collect its silver. The silver was received by a scribe called Sîn-imguranni, no doubt a palace official. The fact that it could take a long time for the palace to receive the payment that was owed is also clear from the letters showing that Ilšu-ibni needed several reminders and the arrival of the royal courier Rišatum before he came to Babylon to settle the debt.

2. The third phase reappraised

2.1. *Corpus of palace wool loans*

As mentioned earlier, we now have twenty-six palace wool loan documents at our disposal, dating from Ad 22 to Aš 13. According to the moment of repayment we can divide them in two types: (1) the wool loans to be repaid when claimed by the palace, and (2) the wool loans to be repaid within a set period. All loans of type 1 are to be paid in silver. The majority of them states that the silver is to be paid to the (courier of the) palace when claimed. Note, however, that two of them state that the silver is to be paid to the bearer of his/their tablet [*ana naši kanikīšu(nu)*] when claimed by the palace. The majority type 2 loans are to be paid in silver, three of them are to be paid in barley. All loans of type 2 are to be paid to the bearer of his/their tablet [*ana naši kanikīšu(nu)*].

The phrase *ana naši kanikīšu* ‘to the bearer of his tablet’ implies that the loan is not necessarily to be repaid to the person(s) named as creditor(s) on the tablet. According to Skaist²² there are two views as to who the *naši kanikīšu* was, viz. the creditor – in which case the *ana naši kanikīšu* phrase is actually superfluous – or an agent of the creditor. According to Van De Mieroop,²³ the *ana naši kanikīšu* phrase indicates that a loan or claim for payment in the future could be passed on from one creditor to another, or from a creditor to his agent, or in other words, that the document became a transferable note. Stol²⁴ takes the view that a document with the *ana naši kanikīšu* phrase became a cheque to bearer, frequently used in the small circle of merchants who knew and trusted each other. I will return to this below.

One tablet, CT 48, 119 (Aš 01–iii–12), has lost its lower half, so that it is impossible to attribute it to one of both types. Although the beginning of the text and the date are exactly the same as CT 8, 11c, the traces of the name of the debtor do not correspond to the name of the debtor in CT 8, 11c, so contrary to Charpin,²⁵ I consider these to be two different tablets. Moreover, there is no reason for the existence of duplicates of these tablets, since only the creditor would need legal proof.

2.2. Palace wool loans to be repaid when claimed by the palace

Thirteen documents are palace wool loans to be repaid when claimed by the palace. They date from Ad 22 to Aš 13. Eleven of them are to be paid to the palace or the courier of the palace: BM 80636, BM 80644, BM 80422, BDHP 19, CT 6,

37c, CT 8, 11c, 21a, 30b, 36a and VS 29, 70 and 86. Two of them are to be paid to the ‘bearer of his/their tablet’: BM 81582 and BM 81591.

Being a genre only developed in the late Old Babylonian period, the structure of the palace wool loan, which is in reality a sale of wool with deferred payment and therefore also called wool credit sale, varies considerably (cf. Table A).

2.2.1. Description of the palace wool

Most of the palace wool loans begin with an amount of wool, going from 1 mina (½ kilo) to more than 1 talent (30 kg). One document (BM 81591), however, starts with an amount of silver being the price of the amount of palace wool. The fact that, in exchange for the wool, silver was to be paid clearly made the scribe of this tablet decide to mention the silver first. This is not surprising and moreover prevalent in the palace wool loans to be repaid within a set period, which will be discussed hereafter.

Seven loans mention the weight-stone used to weigh the wool: in four cases it is the weight-stone for goods received by the palace (na₄ *namharti é-gal*), in one case the normal weight-stone (na₄ *gi-na*), in two cases the line is broken after na₄. Eight documents explicitly state that it concerns palace wool, either on the first line by adding *ša é-gal* ‘of the palace’ to *síg* ‘wool’ or by the phrase *ša síg ša é-gal* ‘part of the wool of the palace’. In seven loans it is stated that the creditor received the wool in the palace.

2.2.2. Wool for silver

In most cases the amount of silver to be paid is set, only once (or maybe twice)²⁶ it is said that the debtor will have to pay *kīma kargulli é-gal* ‘according to the market value of the palace’ (CT 6, 37c). Eight documents mention the price of the wool in silver by means of the phrase *kù.bi x gín x še* ‘its silver (is) x shekels and x grains’ or the phrase *šám x gín kù-babbar* ‘the price (is) x shekels silver’. In two of these texts the wool/silver rate (*ki-lam*) is added: *ki-lam 5 ma-na ana 1 gín* (VS 29, 70) and *ki-lam 6 ma-na ana 1 gín* (CT 8, 11c).

Whereas from Ad 22 to Ad 26 the wool/silver rate was 5 minas of wool for 1 shekel of silver, this became 6 minas of wool for 1 shekel of silver from Ad 26 onward and seems to stay at that rate until Aš 13. During Ad 26, both rates still occur (6 ma-na:1 gín in month vi and 5 ma-na:1 gín in month viii), which seems to imply that only by the end of Ad 26 the price of wool was reduced.

In two texts (BM 80636 and BDHP 19) the amount of silver to be reimbursed, when the palace claims it, is mentioned. It is remarkable that these follow the same wool/silver rate (5 ma-na:1 gín in Ad 23 and 6 ma-na:1 gín in Ad 29), which means the profit the creditors made had already been included in the price in silver mentioned after the amount of wool. The change in the wool/silver rate might of course be dependent on the quality of the wool, but this is never specified. The fact that Utul-Ištar is the official responsible seems to imply that the wool price was set by the palace authorities, but this is unfortunately not verifiable as none of the documents stating the reimbursements by the intermediaries to the palace specify a wool/silver rate. We can venture the hypothesis that the palace did indeed set the price and, positing that the proposition had to be financially worthwhile for the entrepreneurs, set it lower than the market value at that time. In all, we can conclude that the wool/silver rate seems to have been rather stable throughout these 29 years (Table A, see p. 218).

2.2.3. The responsible official

In all cases but two (VS 29, 70 and 86), the palace scribe Utul-Ištar²⁷ is named as the responsible official.

2.2.4. The creditors

As can be seen in Table A, there are only 3 different creditors named in the palace wool loans to be repaid when claimed by the palace:

- (1) From Ad 22 to Ad 26: the well-known overseer of the merchants, Ilšu-ibni
- (2) From Ad 29 to Aš 1: his son, the judge Utu-šumundib, who succeeded his father as overseer of the merchants later on²⁸
- (3) Aš 13: Išme-Sîn, son of Sîn-bêl-aplim.

Date	Text	Amount of wool	Price in silver	Rate	Reimbursement
Ad 22-iv-14	VS 29, 70	1 gú 2½ ma-na	12½ gín 16 še	5 ma-na:1 gín	
Ad 23-vii-06	BM 80636	30 ma-na		5 ma-na:1 gín	6 gín
Ad 24-iii-16	BM 80644	31½ ma-na 2½ gín	6½ gín 7½ še	5 ma-na:1 gín	
Ad 26-vi-22	CT 8, 36a	1 gú-un	10 gín	6 ma-na:1 gín	
Ad 26-viii-01	BM 81582	10 ma-na	2 gín	5 ma-na:1 gín	
Ad 29-vi-21	BDHP 19	1 ma-na		6 ma-na:1 gín	½ gín
Ad 37-vii-[...]	BM 81591	6 ma-na	1 gín	6 ma-na:1 gín	
Aš 01-iii-12	CT 8, 11c	1 gú-un	10 gín	6 ma-na:1 gín	
Aš 13-iv-20	CT 8, 21a	1 gú-un	10 gín	6 ma-na:1 gín	
Aš 13-v-10	CT 8, 30b	1 gú-un	10 gín	6 ma-na:1 gín	

Table. 12.1. Wool/silver rate palace wool loans to be repaid when claimed by the palace.

Unlike the first two creditors who can clearly be linked to the *kārum*, we have no idea what position Išme-Sîn held. He is defined by a patronymic, whereas the other two have a title, which implies that Išme-Sîn did not have any title at that time.

2.2.5. The debtors

It is worth noting that in most documents there are multiple debtors, often brothers and/or partners, which might explain the rather large amounts of wool they lent. These joint investments were no doubt advantageous as they spread the risks. The fact that they only had to pay when the palace claimed its silver, which could be up to five years later, made it possible for them to market the wool through a series of smaller transactions and to gain a profit.

Moreover, the same groups of debtors lent wool on several occasions, which might imply that they did this on a (semi-)professional basis:

- (1) Taribum, son of Ibbi-Šamas, Ipqu-Mamu and Bēliyatūm, sons of Ilšu-bani and Kubburum lent wool from Ilšu-ibni, overseer of the merchants on two occasions: VS 29, 86 (Ad [...]) and CT 8, 36c (Ad 26). In VS 29, 86 the amount of wool is broken, but in CT 8, 36c they lent 1 talent of wool.
- (2) Šamaš-bani, Ili-kīma-abīya and Ipqatūm, sons of Taribum lent more than 1 talent of wool from Ilšu-ibni, overseer of the merchants in Ad 22 (VS 29, 70); 7 years later, Šamaš-bani and Ipqatūm – this time without their brother Ili-kīma-abīya – lent 1 mina of wool from Utu-šumundib (BDHP 19).
- (3) Warad-Ibari and Šamaš-bani, sons of Etel-pī-Šamaš lent wool from Ilšu-ibni, overseer of the merchants on two occasions: more than 1/2 talent in Ad 24 (BM 80644) and 1 talent one year later in Ad 25 (BM 80422).
- (4) Marduk-mušallim, son of Sîn-iddinam and Ilšu-ibni, son of Sîn-eribam lent 1 talent of wool, together with their partners, the sons of Nūr-Šamaš, from Išme-Sîn in month vi of Aš 13 (CT 8, 21a) and another talent only 20 days later (CT 8 30b) together with Ilšu-ibni's brother Bēlšunu. As is shown by the reimbursement document BDHP 30 (Aš 15-iv-18), they repaid

only the first half of the amount due almost two years later (cf. *supra*).

2.2.6. The reimbursement time and the recipients

All thirteen palace wool loans are to be repaid when claimed by the palace. In most texts this is indicated by the phrase *ūm é-gal kù.babbar irrišu kù.babbar ì-lá-e* (meš) ‘the day the palace demands the silver, he/they must pay the silver’. Two texts (BDHP 19 and CT 6, 37c, both Ad 29) use instead *ūm mušaddinu é-gal išassû* ‘the day the tax collector of the palace calls’. Three texts (CT 8, 11c [Aš 1], 21a and 30b [both Aš 13]) use *ūm šisi / tisi é-gal iššassû* ‘the day the summons by the palace is issued’.²⁹ From the reimbursement documents, we know this could be up to five years later. In other words, these were long-term loans.

An interesting question is who received the silver which was to be paid when the palace claimed it. Five texts state that the silver is to be paid to the palace (*é-gal*). Two texts state the silver is to be paid to the courier of the palace (*na-aš-bar é-gal*), who, according to the aforementioned *zehpums* (cf. *supra*) was called *Rišatum*. The traces legible on VS 29, 86: 14 show a person or profession starting with *ni*-.

Two texts, however, state that the silver is to be paid *ana naši kanikišu(nu)* ‘to the bearer of his/their tablet’. This is remarkable, since we know from the reimbursement documents BM 80997 (Ad 23–ix–08), BM 80905 (Ad 23–xii–19) and CT 48, 72 (Ad 30–x–25) that in Ad 23 it was *Ilšu-ibni*, overseer of the merchants of Sippar-Jahrūrum, and later on, in Ad 30, *Utu-šumundib*, judge and son of *Ilšu-ibni*, overseer of the merchants, and *Eṭirum*, son of *Saniq-pī-Samaš*, from the *kārum* of Sippar-Jahrūrum, who paid the silver to the palace (through the courier *Rišatum* or directly). This is confirmed by the aforementioned *zehpums* in which the addressee (*Ilšu-ibni*, overseer of the merchants of Sippar-Jahrūrum) is urged to give the silver to the courier or to come to Babylon with the courier to bring the silver. In other words, the debtors had to repay the creditors/intermediaries (*Ilšu-ibni* and later *Utu-šumundib*) who on their turn repaid the palace authorities.

The use of the *ana naši kanikiši(nu)* clause can thus be explained in two ways: (1) the *naši kanikišu(nu)* was an agent or co-worker of the creditor/intermediary who could collect the silver in their place, or (2) the creditor/intermediary could resell the loan document to a third party in exchange for the amount of silver due or pass it on to a third party whom he owed a corresponding amount of silver. If the *naši kanikišu(nu)* was indeed an agent or co-worker of the creditor/intermediary, it is remarkable that only two documents have this clause, as it must have been common practice. The second explanation seems therefore more likely, especially as it concerns rather small amounts of silver (2 shekels in BM 81582 and 1 shekel in BM 81591). As such, the loan document became a cheque to bearer which could easily be used to pay for goods or to pay off debts.

2.3. Palace wool loans to be repaid back within a set period

Twelve documents are palace wool loans to be repaid within a set period: BM 79802, BM 78633, BM 81236, BM 81196, BM 80990, BM 81004, CBS 1196, BBVOT 1, 132, CT 6, 35c, OLA 21, 47 and 70 and TLOB 28. They date from Ad 29 to Aš 13. All of them are to be paid *ana naši kanikišu(nu)* ‘to the bearer of his/their tablet’. Eight of them are to be repaid in silver, four in barley.

Like the long-term palace wool loans, the structure of the palace wool loan to be

repaid within a set period also varies considerably (cf. Table 12.2).

2.3.1. Description of the palace wool

Whereas in the long-term palace wool loans discussed above the amount of wool to be lent out is – apart from one exception – always mentioned first and described as ‘part of the palace wool’ (ša síg é-gal), this is not the case in the palace wool loans to be repaid within a set period. Here, the amount of wool to be lent out is not always mentioned first, on the contrary: in 2/3 of the cases the amount of silver to be paid or the amount of barley to be delivered is mentioned first. Moreover, in most cases, wool, silver and barley are described as ša šám síg (ša) é-gal ‘part of the sale of the palace wool’.

One could argue that the texts in which the silver is mentioned first are in fact silver loans and that the ša šám síg ša é-gal clause is simply included for accounting purposes, so that the creditor would be able to identify the silver he lent out as silver he earned by lending out wool previously. This makes sense as the silver in question would one day have to be paid to the palace. However, this makes no sense at all for the texts in which barley is mentioned first. If these were simple barley loans, why would the creditor feel the necessity to include the ša šám síg ša é-gal clause? Why would he consider it necessary to be able to identify the barley he lent out as barley he earned by lending out wool previously? It was not barley but silver that had to be paid to the palace in the end. Moreover, all loan documents to be paid in barley, mention the amount of barley first, which would then imply that they all were barley loans and none of the palace wool loans to be paid in barley have been preserved. In my opinion, all of these documents are palace wool loans, all the more so since the texts mentioning the amount of wool first also have the ša šám síg ša é-gal clause and all of these loan documents involve the palace official Utul-Ištar, mostly as the responsible officer and twice as creditor. Moreover, four loans, two of which mention silver first and two of which mention barley first, indicate that the creditor(s) received the wool (at the palace). The fact that, in exchange for the wool, silver or barley was to be paid, made the scribes decide to mention the silver or barley first in most cases.

Four of these palace wool loans (BM 79802, BM 81196, BM 81004 and CT 6, 35c) start by mentioning an amount of wool, going from 6 minas (3 kg) to one talent (30 kg). Only one document (CT 6, 35c) mentions the weight-stone used to weigh the wool which was in this case the normal weight-stone (na₄ gi-na). In all cases the wool is described as being ša šám síg (ša) é-gal ‘part of the sale of the palace wool’. In all cases the amount of silver to be paid is set, expressed once by means of the phrase kù.bi x gín ‘its silver (is) x shekels’ and three times by the phrase šám x gín kù-babbar ‘the price (is) x shekels silver’.

Four of these palace wool loans (BM 81236, BM 80990, CBS 1196 and OLA 21, 47) start with an amount of silver, going from 2 to 15 shekels (16,6 to 127,5 grams). In one document (CBS 1196) this is sealed silver (kù-babbar *kankum*). Two documents (CBS 1196 and OLA 21, 47) mention the weight-stone used to weigh the silver which was that of Šamaš (na₄ ʾutu). All but one (OLA 21, 47) indicate the amount of wool corresponding to the price in silver mentioned. OLA 21, 47 simply indicates that the amount of silver is the price of palace wool (šám síg ša é-gal), implying that that wool/silver rate was fixed.

Four of these palace wool loans (BM 78633, OLA 21, 70, BBVOT 1, 132 and

TLOB 28) start with an amount of barley, going from 1 to 4 gurs (300 to 1200 litres). Two documents (BM 78633 and OLA 21, 70) mention the measure used to measure out the barley which was the wooden bán-measure of Šamaš (*gišbán dutu*). In all cases the barley is described as being ša šám síg (ša) é-gal ‘part of the sale of the palace wool’. None of them indicate the amount of wool corresponding to the price in barley mentioned. The fact that four of these loans were to be paid in barley instead of silver can no doubt be explained as a advantageous way to obtain barley which could be used either as food, to cook or to ration, or as currency, to buy or to lend out.

Date	Text	Amount of wool	Price silver	Rate
Ad 30-v-05	CBS 1196	1 gú	12 gín	5 ma-na:1 gín
Aš 02-v-01	CT 6, 35c	1 gú	10 gín	6 ma-na:1 gín
Aš 02-vi-[...]	BM 79802	6 ma-na	1 gín	6 ma-na:1 gín
Aš 09-iii-08	BM 81196	40 ma-na	10 gín	4 ma-na:1 gín
Aš 09-iv-10	BM 80990	8 ma-na	2 gín	4 ma-na:1 gín
Aš 09-[...]-19	BM 81236	1 gú	15 gín	4 ma-na:1 gín
Aš 13-viii-28 ⁷	BM 81004	7 ma-na	1 gín	7 ma-na:1 gín

Table. 12.2. Wool/silver rate palace wool loans to be repaid within a set period.

2.3.2. Wool for silver

The amount of wool lent out goes from 6 minas (3 kilos) to 1 talent (30 kg). In all texts but one, the amounts of wool and their respective value in silver are given, which makes it possible to calculate the wool/silver rate. It is clear that the wool price was subject to fluctuations, especially during the reign of Ammišaduqa: whereas in Ad 30 the wool/silver rate was 5 minas of wool for 1 shekel of silver, this was 6 mina of wool for 1 shekel of silver in Aš 2, 4 minas of wool for 1 shekel of silver in Aš 9 and 7 minas of wool for 1 shekel of silver in Aš 13. In two texts (CBS 1196 and CT 6, 35c) the amount of silver to be reimbursed after respectively one and two months is mentioned: again these follow the same wool/silver rate, which means the profit the creditors receive was already calculated in the value or price in silver mentioned before or after the amount of wool.

2.3.3. Wool for barley

The exact amount of wool lent out is never mentioned, only the price in barley is specified. The amount of barley to be delivered at harvest time is not mentioned either. One loan (BBVOT 1, 132) specifies that barley must be delivered at harvest time at the current rate (ki-lam *ibaššú*) weighed with the wooden bán-measure of Šamaš.

2.3.4. The responsible official

In five texts, the palace official Utul-Ištar – dub-sar (Ad 30 to Aš 4) and later *abi erén* (Aš 7 to Aš 9) – is mentioned as the responsible official. In the most recent text, BM 81004 (Aš 13-viii-28⁷), IddinNabium, whose title is unfortunately illegible, is mentioned as the responsible official. Might this imply that by that time Utul-Ištar had been replaced in this function by Iddin-Nabium, although the latter bears another title? The most recent attestation of Utul-Ištar being responsible official (nì-šu) is CT 8, 30b (Aš 13-v-10) which would in that case imply he was replaced in this function somewhere between the third and eighth month of Aš 13. However, in *TJDB* 38–39 (Aš 14-iii-19), a sesame oil loan to be

paid back in silver to the bearer of his tablet within ten days,³⁰ Utul-Ištar, *abi* erén is creditor. Although the palace is not mentioned in this tablet, the involvement of Utul-Ištar, albeit not as the responsible official (nì-šu) but as a creditor (ki), suggests this is a palace sesame oil loan, which would then imply that he was still active in the palace trade in Aš 14.

2.3.5. The creditors

As can be seen in Table B (see p. 218), there are seven different creditors:

- (1) From Ad 29 to 30: Sîn-išmeanni and Ibni-Šamaš, sons of Awiliya
- (2) Aš 2: Utu-šumundib, judge and son of the overseer of the merchants Ilšu-ibni
- (3) From Aš 2 to 4: Iddin-Ea, judge, son of Ibni-Šamaš
- (4) From Aš 4 to 7: Ipqu-Annunītum, son of Ibni-Šamaš
- (5) Aš 9: the well-known palace official Utul-Ištar, *abi* erén
- (6) Aš 9: Ilšu-bani, judge, son of the overseer of the merchants Ilšu-ibni and brother of Utu-šumundib
- (7) Aš 13: Salluhi, dam-gàr é-gal, son of Iddin-Šamaš.

Apart from the judge Utu-šumundib, and the palace official Utul-Ištar, none of these texts have the same creditors as the first group. It is moreover worth noting that Utul-Ištar, responsible official in the greater part of all palace wool loans under consideration in this paper, is twice attested as creditor in Aš 9. In BM 81236 he is replaced (*ana qabê*) as creditor by Ilšu-bani, son of the overseer of the merchants Ilšu-ibni and brother of Utu-šumundib, who himself is creditor in the same year. The texts in which Utul-Ištar acts as creditor do not mention a responsible official, which is not surprising as his involvement as creditor made the presence of a responsible official superfluous.

Sîn-išmeanni, son of Awiliya, is attested as a merchant (dam-gàr) in BE 6/1, 85 (Ad 32–iii-13) where he lends out palace silver under the responsibility of Utul-Ištar to buy barley. His brother, Ibni-Šamaš, whose title is unknown,³¹ lends out a sizeable amount of palace barley without interest under the responsibility of Utul-Ištar in PBS 8/2, 214 (Ad 33–i-16). Both brothers are clearly involved in the palace trade in general.³²

Iddin-Ea and Ipqu-Annunītum are brothers as both are attested in the Sippar texts as judges and as sons of Ibni-Šamaš during the reigns of Ammiditana and Ammišaduqa. Their father Ibni-Šamaš was also judge, just like his father Šamaš-nāšir.³³

The titles and patronyms of the creditors show that the palace wool trade in Sippar was mainly in the hands of judges and merchants, often even brothers, such as Utu-šumundib and Ilšu-bani, sons of Ilšu-ibni, Sîn-išmeanni and Ibni-Šamaš, sons of Awiliya and Iddin-Ea and Ipqu-Annunītum, sons Ibni-Šamaš.

2.3.6. The debtors

Contrary to the long-term palace wool loans, most debtors act alone here. Moreover, none of the debtors lent on more than one occasion. This might off course be due to our scarce documentation. One of the debtors is a woman, Erištum, daughter of Šamaš-bêl-ili (OLA 21, 70 [Ad 29]), whose name gives the impression that she might have been a *nadītum* woman. Another debtor, Taribu, son of Ipqu-Annunītum, is sanga priest of Ištar of Agade.

2.3.7. The reimbursement time and the recipients

All eleven palace wool loans are to be repaid within a set period. For most of the loans to be repaid in silver the term of payment is one month, once it is two months and once the term of payment is broken. All loans to be repaid in barley are to be repaid at harvest time (u₄-buru₁₄-šè). As harvest generally took place in the first month of the year, the terms of payment for BM 78633, BBVOT 1, 132 and TLOB 28 were respectively five, one and two months. It is thus clear they were all short-term loans.

All short-term palace wool loans are to be paid to *naši kanikišu(nu)* ‘the bearer of his/their tablet’. Again, this clause can be explained in two ways: (1) the *naši kanikišu(nu)* was an agent or co-worker of the creditor who could collect the silver or barley in his place, or (2) the creditor could resell the loan document to a third party in exchange for the amount of silver or barley due or pass it on to a third party whom he owes a corresponding amount of silver or barley. Again, the second explanation seems more likely, especially as it concerns short-term loans and the person taking over or buying the loan could expect to be reimbursed himself rather soon. The fact that all short-term loans are to be paid to *naši kanikišu(nu)* confirms this.

2.4. Palace wool loans: long-term vs. short-term loans

As is shown from what precedes, there are four differences between the short-term and longterm palace wool loan documents:

- (1) the way the wool to be lent out is described
- (2) the time of reimbursement
- (3) the commodity in which the wool loan had to be paid back
- (4) whom the loan had to be paid back.

Whereas all the long-term loans, apart from one exception, mention the amount of wool to be lent out first and most of them describe the wool as ‘part of the palace wool’ (šà síg é-gal), this is not the case in the short-term loan documents. Here, in two thirds of the cases the amount of silver to be paid or the amount of barley to be delivered is mentioned first. Moreover, in most cases, wool, silver and barley are described as ‘part of the sale of the palace wool’ (šà šám síg é-gal).

The genre of palace wool loans only developed in the late Old Babylonian period, which explains the variations in its formulation. The fact that, in exchange for the wool, silver or barley was to be paid made the scribe decide to mention the silver or barley first in the greater part of the short-term loans.

Whereas most long-term loans have to be paid back in silver to the palace the day the palace claims it – two of them have to be paid to the bearer of his/their tablet – all short-term loans have to be paid back in silver within 1 to 2 months or in barley at harvest time to the bearer of his/their tablet.

Short-term loans		
the type of wool		
the time of reimbursement		
the commodity of reimbursement		
the creditor to whom to be paid back		

Table 12.3. Differences between long-term and short-term, loans.

As for the creditors, we noticed that there are only three different creditors named in the longterm loans, but seven different creditors in the short-term loans. Only

one creditor appears in both long-term and short-term loans, viz. Utu-šumundib, judge, son and later successor of Ilšu-ibni, overseer of the merchants of Sippar-Jahrūrum.

In the long-term loans the creditors are at first Ilšu-ibni, the overseer of the merchants (Ad 22 to 26) and after him, his son, the judge Utu-šumundib (Ad 29 to Aš 1); last we have Išme-Sîn, whose title or profession we do not know. In the short-term loans the creditors are mainly merchants (Sîn-išmeanni [Ad 29 to 30]) and judges (Utu-šumundib [Aš 2], Iddin-Ea [Aš 2 to 4], Ipqu-Annunītum [Aš 4 to 7] and Ilšu-bani [Aš 9]) and moreover often brothers (Utu-šumundib/Ilšu-bani, Sîn-išmeanni/Ibni-Šamaš, Iddin-Ea/Ipqu-Annunītum). It is worth noting that Utu-šumundib, who succeeded his father as overseer of the merchants in Aš 4, is never attested as creditor in this function. One might even see an evolution here: whereas earlier on (Ad 22 to 26) the overseer of the merchants acts as creditor, this role is taken over later on (from Ad 29) by judges and merchants. However, prudence is in order here, as this might be due to the scantiness of the documentation and the fact that we do not have short-term loans prior to Ad 29.

Another important question is who received the wool at the palace. All but one (BM 80422) of the loans mentioning Ilšu-ibni as a creditor state that he received the wool at the palace (*ša Ilšu-ibni ugula dam-gàr ina é-gal imhuru*)³⁴ – which also appears from the letters that are preserved. Only one loan mentioning Utu-šumundib as a creditor (BM 81591 [Ad 37]) states that he received the wool (at the palace).³⁵ However, from the reimbursement document CT 48, 72 (Ad 30), we know that he – in this case together with Eṭirum, son of Saniq-pī-Šamaš from the *kārum* of Sippar-Jahrūrum – received wool, three-year-old oxen and sesame in the palace in Ad 24.³⁶ In other words, Utu-šumundib already received goods at the palace in his function of judge, long before he succeeded his father as overseer of the merchants in Aš 4. This is confirmed by the short-term loans stating that Sîn-išmeanni, merchant, and his brother Ibni-Šamaš received wool at the palace in Ad 30 (CBS 1196) as well as the judges and brothers Iddin-Ea and Ipqu-Annunītum in Aš 2 and 4 (OLA 21, 47, BM 79802 and BBVOT 1, 132). We must thus conclude that receiving wool at the palace was no privilege of the overseer of the merchants alone. Apparently, this task was awarded to an inner circle of people, apart from the overseer of the merchants, mainly judges and merchants, no doubt connected to the *kārum* of Sippar.

Considering the wool/silver rate of both the long- and short-term loan documents over a period of 29 years (Ad 22 to Aš 13), we see the wool price was fairly stable for the greater part of this period (Ad 22 to Aš 2), but was subject to some fluctuations from Aš 9 to Aš 13. The wool/silver rate in general was no doubt dependent on the quality of the wool, which might explain these fluctuations. However, the quality of the wool is never mentioned in our documents and one might assume that the palace vouched for a certain quality of wool, especially so since the wool price was probably set by the palace authorities, as Utul-Ištar is the official responsible in nearly all documents. There is moreover no indication that the wool/silver rate is different in the long- and short-term loans.

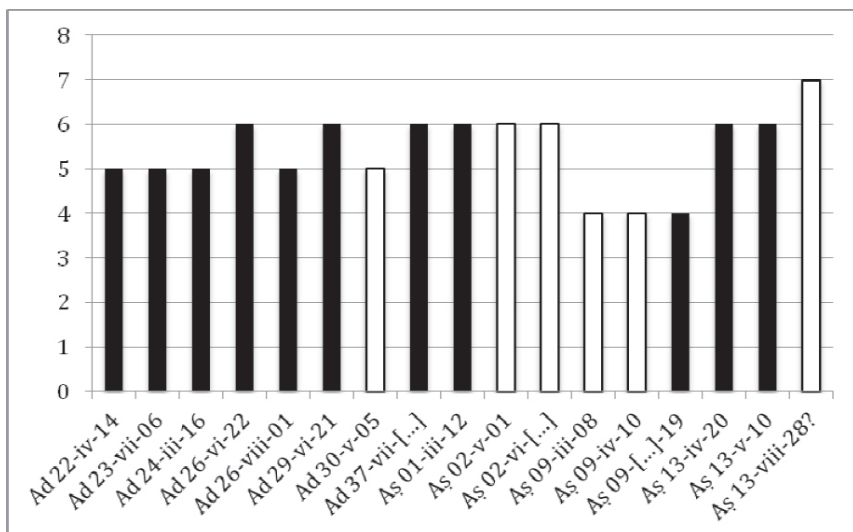


Fig. 12.1. Wool/silver rate palace wool loans. Black = long-term loans; white = short-term, loans.

The fact that the same kind of people, apart from the overseer of the merchants, judges and merchants, and even the palace official Utul-Ištar, act as creditors and that equally small and large amounts of wool were lent in both the long- and short-term loans, seems to imply that the only significant differences between both types of palace wool loans were the term of payment, the commodity in which one had to repay and person(s) whom one had to repay. This can all be explained in terms of profit making. The creditors who received the wool at the palace only had to pay silver to the palace when the palace claimed it, which could be up to five years. Instead of simply lending the wool out to individuals in order to obtain silver when the palace claimed it, they could also, within this rather long period, lend part of the wool on a short-term basis to obtain silver or barley, which they could then lend out again in order to make more profit or use as food or as currency to buy. The fact that all short-term loans were to be paid to the bearer of his/their tablet, seems to imply, moreover, that they functioned or at least could function as a kind of cheque to bearer which could easily be used to pay for goods or to pay off debts. The profit they made with the long-term loans (to be paid when the palace claimed its silver) could be enhanced by the short-term loans. One can wonder why they would not always have combined the two. This could have happened more often than we know because the relevant documents might not have been preserved. There may also have been a natural limitation of the short-term loans since debtors would have to be found willing to engage in such an agreement; there is a limit to the amount of wool they could have used or sold.

From the preceding, we can conclude that the palace made use of the services of the overseer of the merchants, merchants, judges, and other people related to the *kārum*, in order to commercialise their surplus of wool, and turn the wool into silver. According to Kraus,³⁷ the palace acted in this way in order to avoid involving itself in a production, distribution and surveillance organisation as well

as to avoid risks. Obviously, a price had to be paid for this: the silver received was less than if the palace had handled these matters itself. Indeed, in order to make this a worthwhile proposition for the intermediaries they had to have a profit margin. Once the wool was received, the intermediaries commercialised it through long-term and short-term loans: long-term loans to individuals who for their part could gain a profit by lending it out through a short-term loan or by selling it, and short-term loans in order to generate a quick financial return. At the end, when the palace claimed its silver, the intermediary had to pay the silver to the palace. As this could be one to five years after the receipt of the wool, the intermediaries would have had enough time to make a personal profit by issuing out short-term loans.

As for the value of the wool, we see that this was rather stable for the greater part of this period (Ad 22 to Aş 2), but was subject to some fluctuations from Aş 9 to Aş 13, the cause of which is unknown to us. Finally to show how many uncertainties remain, we can add that it is not really possible to be sure these prices reflected the actual value of the wool 'on the market', they might be lower prices fixed by the palace for the entrepreneurs in order to assure them of a net profit. Their variation would reflect the yearly variation of the 'real' wool prices since the loan prices would have had to stay lower than these.

We see that the merchants, although they no doubt were 'all wool and a yard wide' were not averse to making an additional profit wherever and however they could, *nil novi sub sole*.

Table A. Long-term Palace Wool Loans: Silver to be Repaid when Claimed by the Palace

text	date	amount wool	weight-stone	value silver	receiver palace	responsible	creditor	debtor(s)	reimbursement time	reimbursed	reimbursement amount
VS 29, 86	Ad [...]-vi[-...]	[...]	[...]	[...]	İlšu-ibni udg		İlšu-ibni udg	Taribum, son of İbbi-Samaš, Eṭurum and Samaš-bani [sons of Warad-Sin], Ipqu-Mamu [and Bēllyatū], sons of İlšu-bani, Kubburum and [PN]	ām [...]	ni[-...]	'kr[ma kargullī ē-gal]?
VS 29, 70	Ad 22-iv-14	1 gú 2 ½ ma-na	na, 'gi-na'	12 ½ gín 16 še	İlšu-ibni udg		İlšu-ibni udg	Samaš-bani, İli-kima-abya and Iqqatum, sons of Taribum	ām ē-gal irrušu		
BM 80636	Ad 23-vii-06	30 ma-na	na, namharti ē-gal		İlšu-ibni udg	Utu-İstar ds	<İlšu-ibni udg>	Nidīnūrum, [PN], Sin-iqīšam and his partners, sons of [...]	ām ē-gal irrušu	ē-gal	6 gín
BM 80644	Ad 24-iii-16	31 ½ ma-na 2 ½ gín	na, [...]	6 ½ gín 7 ½ še	İlšu-ibni udg	Utu-İstar ds	İlšu-ibni udg	Warad-İbani and Samaš-bani, sons of Eṭel-pi-Samaš	ām ē-gal irrušu	na-ai-bar ē-gal	
BM 80422	Ad 25-v-25	1 gú	na, [...]			Utu-İstar ds	İlšu-ibni udg	Samaš-bani and Warad-İbani, sons of Eṭel-pi-Samaš	ām ē-gal irrušu	na-ai-bar ē-gal	
CT 8, 36a	Ad 26-vi-22	1 gú-un		10 gín	İlšu-ibni udg	Utu-İstar ds	İlšu-ibni udg	Taribum, son of İbbi-Samaš, Ipqu-Mamu and Bēllyatū, sons of İlšu-bani and Kubburum	ām ē-gal irrušu	ē-gal	
BM 81582	Ad 26-viii-01	10 ma-na		2 gín	İlšu-ibni udg	Utu-İstar	İlšu-ibni udg	Nidīn-Eulmaš, Kubburum and Kinātum, sons of [PN]	ām ē-gal irrušu	naši konikšumu	
BDHP 19	Ad 29-vi-21	1 ma-na	na, namharti ē-gal			Utu-İstar ds	Utu-šumundib dk	Samaš-bani and Iqqatum, sons of Taribum	ām mušoddinu ē-gal išessu		½ gín
CT 6, 37c	Ad 29-vi-26	1 ma-na	na, namharti ē-gal			Utu-İstar ds	Utu-šumundib dk	Sin-nādin-šumi, son of Bēlram	ām mušoddinu ē-gal išessu		kīma kargullī ē-gal
BM 81591	Ad 37-vii[-...]	6 ma-na		1 gín	Utu-šumundib dk	Utu-İstar ds	Utu-šumundib dk	Yawirah, son of Eṭur-rabi	ām irrušu	naši kamikšu	
CT 8, 11c	Aş 91-iii-12	1 gú-un	na, namharti ē-gal	10 gín		Utu-İstar ds	Utu-šumundib dk	İlšu-ibni, son of Bēllyatū	ām tūti ē-gal išessu	ē-gal	
CT 8, 21a	Aş 13-iv-20	1 gú-un		10 gín		Utu-İstar ae	İme-Sin, d Sin-bēl-aplim	Mardu-kušallim, son of Sin-iddinam, İlšu-ibni, son of Sin-eribam and the sons of Nūr-Samaš, their partners	ām tūti ē-gal išessu	ē-gal	
CT 8, 30b	Aş 13-v-10	1 gú-un		10 gín		Utu-İstar ae	İme-Sin, d Sin-bēl-aplim	Mardu-kušallim, son of Sin-iddinam, İlšu-ibni and Bēlšunu, sons of Sin-eribam	ām tūti ē-gal išessu	ē-gal	

Table B. Short-term Palace Wool Loans: Silver or Barley to be Repaid within a Set Period

text	date	amount wool	value silver	value barley	receiver palace	responsible	creditor	debtor(s)	reimbursement time	reimbursers	reimbursement amount
OLA 21, 70	Ad 29-[...]-[...]			1 gur		Utul-Īštar ds	Sin-iṣmeanni and Iḫni-Šamaš, sons of Awilīya	Erišum, daughter of Šamaš-bēl-ili	u ₄ -buru ₄ -iē	ana naši kamikīšu	
CBS 1196	Ad 30-v-05	1 gū	12 gín		Sin-iṣmeanni and Iḫni-Šamaš, sons of Awilīya	Utul-Īštar ds	Sin-iṣmeanni and Iḫni-Šamaš, sons of Awilīya	Erišum, son of Sizzatum	ana iti-1-kam	ana naši kamikīšu	12 gín
CT 6, 35c	Aš 02-v-01	1 gū	10 gín			Utul-Īštar ds	Utu-šumundib dk	Sin-iddinam, son of Apil-iššu and Iluni, son of Bēlšunu	ana iti-2-kam	ana naši kamikīšunu	10 gín
OLA 21, 47	Aš 02-vi-03		[x] gín		Iddin-Ea dk	Utul-Īštar ds	Iddin-Ea dk	Iḫni-Šin, bow-maker, son of Erišum	ana iti-1-kam	ana naši kamikīšu	
BM 79802	Aš 02-vi-[...]	6 ma-na	1 gín			Utul-Īštar ds	Iddin-Ea dk	Alpuni, fuller, [son of PN]	ana iti-1-kam	ana naši kamikīšu	
BM 78633	Aš 04-viii-02			4 gur	Iddin-Ea dk, son of Iḫni-Šamaš	Utul-Īštar ds	Iddin-Ea dk	Sin-nādin-šumi, son of Marduk-nāšir	u ₄ -buru ₄ -iē	ana naši kamikīšu	
BBVOT 1, 132	Aš 04-xii-20			2 gur	Ipqu-Annumitum, son of Iḫni-Šamaš	Utul-Īštar ds	Ipqu-Annumitum, son of Iḫni-Šamaš	Abu-waagar, son of Taribuša, Iddi, son of Iḫi-labrat and Warad-bunene, son of Damiq-[...]	u ₄ -buru ₄ -iē	ana naši kamikīšu	ki-lam iḫaššū
TLO8 28	Aš 07-xi-11			2 gur		Utul-Īštar ae	Ipqu-Annumitum, son of Iḫni-Šamaš	Taribu, sanga of Ištar of Agade, son of Ipqu-Annumitum	u ₄ -buru ₄ -iē	ana naši kamikīšu	
BM 81236	Aš 09-[...]-19	1 gū	'15' gín			Utul-Īštar ae	ana qabē Iḫi-bani, son of Iḫi-ibni udg	Bēlšunu, son of Iḫnatum, Bēllyatum, son of Atta and Gaz-ilum, son of Iḫni-Adad	ana iti-1-kam	ana naši kamikīšunu	
BM 81196	Aš 09-iii-08	40 ma-na	10 gín			Utul-Īštar ae		Nabium-[...], son of Iḫni-[...]	ana iti-x-kam	ana naši kamikīšu	
BM 80990	Aš 09-iv-10	8 ma-na	2 gín			Utul-Īštar ae	Iḫi-bani, son of Iḫi-ibni udg	Marduk-muballit, son of Iḫi-bani	ana iti-1-kam	ana naši kamikīšu	
BM 81004	Aš 13-viii-28 ^a	7 ma-na	1 gín			Iddin-Nabium	Šalluhi, dšēg, son of Iddin-Šamaš	Awil-Īštar, son of Iḫi-bani	ana iti-1-kam	ana naši kamikīšu	

ds = duḫ.sar / ae = aḫi erin / dk = dī.kud / udg = ugula dam.gar / dšēg = duḫ.sar é.gal

Texts38

A. Palace wool loans

A.1. Long-term palace wool loans: silver to be repaid when claimed by the palace

1.

museumnr: VAT 1267

date: Ad [...]-vi-[...]

reference: VS 29, 86, Pl 47 (handcopy)

Ol 1¹ [...] 2² dingir-šu-ib³ -[ni ugula dam-gàr] i-2⁴ é-gal im-hu⁵ -ru k4dingir-šu-ib-ni [ugula dam-gàr] 1⁶ ta-ri-bu-um⁷ [dumu i-bi-⁸utu] 1⁹ 6¹⁰ i-rum¹¹ utu-¹²ba-ni [dumu-meš Warad-Sîn?] 1¹³ ip-qú-¹⁴ma- mu¹⁵ x¹⁶ [... 'Bēliyātum] 1¹⁷ 8¹⁸ mu-meš dingir- šu¹⁹ -[ba-ni] 1²⁰ ku-ub-bu²¹ -[rum] Lo 1²² x²³ [...] 1²⁴ 3²⁵ ba²⁶ - [an-ti-me š] 1²⁷ 4²⁸ um²⁹ [...] 1³⁰ 2³¹ i³² -[...] Re 1³³ 4³⁴ -na³⁵ ni³⁶ -[...] 1³⁷ k4babbar i-lá-e³⁸ -meš³⁹ 1⁴⁰ 6⁴¹ den-zu-ma-gir⁴² dumu⁴³ den-zu⁴⁴ -[i-din-nam] 1⁴⁵ 7⁴⁶ ip-qá-tum⁴⁷ dumu ta-⁴⁸ri-bu-um⁴⁹ 1⁵⁰ 8⁵¹ ir-i-lí-šu⁵² dub-sar⁵³ 1⁵⁴ 9⁵⁵ kin-dina⁵⁶ na⁵⁷ u⁵⁸ 4⁵⁹ -[x-kam] 1⁶⁰ 10⁶¹ hu⁶² am-mi⁶³ -di-ta-na⁶⁴ lugal⁶⁵ -[e]

21:] 「x」 [...]

Seals: 1: no legend (Rev, left)

seal 2: no legend (Rev, right)

seal 3: no legend (LeE, top1)

seal 4: no legend (LeE, top2)

seal 5: no legend (LeE, bottom1)

seal 6: no legend (LeE, bottom2)

kišib 3 kišib dumu-meš ìr-sin

kišib 4 kišib dumu-meš dingir- šu-ba-ni

kišib 5 kišib ku-ub-bu-rum

kišib 6 kišib sin-ma-gir

Translation

(1') [an amount of palace wool] (2') that Ilšu-ibni, overseer of the merchants (3') received in the palace, (4') from Ilšu-ibni, overseer of the merchants, (5') Taribum [son of Ibbi-Šamaš], (6') Eṭirum (and) Šamaš-bani [sons of Warad-Sîn?], (7') Ipqu-Mamu [... (and) Bēliyatūm] (8') sons of Ilšu-bani, (9') Kubburum (10') and [PN] (11') have received. (12') The day [the palace demands the silver], (13') [according to the market value of the palace?] (14') to [...] (15') they must pay the silver. (16'-18') witnesses (19') (20'-21') date.

Remarks

On Taribum, son of Ibbi-Šamaš is one of the creditors in the palace wool loan CT 8, 36a (Ad 26), together with Ipqu-Mamu and Bēliyatūm, sons of Ilšu-bani and Kubburum.

On Eṭirum, son of Warad-Sîn, cf. CT 45, 43: 13 (Ad 2), CT 4, 15a: 10 (Ad 3). As the kišib on seal 3 (LeE top) reads kišib dumu-meš ìr-sin and the position of seal 3 on the LeE suggests this seal was used by one (or more) of the creditors, it seems plausible that Eṭirum and Šamaš-bani are to identified as the sons of Warad-Sîn.

On Ipqu-Mamu and his brother Bēliyatūm, sons of Ilšu-bani are creditors in the wool palace loan CT 8, 36a (Ad 26), together with Taribum, son of Ibbi-Šamaš and Kubburum. On CT 8, 36a: 8 two signs, the latter of which is AŠ, follow the personal name Ipqu-Mamu, which might be his title or profession. It is, however, unclear to me which title or profession it is. Here, the same title or profession was probably mentioned after which his brother's name Bēliyatūm follows.

On the line can be completed by one of the following phrases: *ūm é-gal kù-babbar irrišu, ūm mušaddinu é-gal išassu, ūm šisi / tisi é-gal išassu*, indicating the silver had to be repaid when claimed by the palace.

Although the KI sign is broken and thus uncertain, this might be the beginning of the phrase *kima kargulli é-gal*, also used in CT 6, 37c.

It is not clear to me to whom the silver had to be repaid here. The other palace wool loans have *ana é-gal, ana na-aš-bar é-gal* or *ana naši kanikišu(nu)*.

2.

museumnr: VAT 776

date: Ad 22?/IV/14

reference: VS 29, 70, Pl 40 (handcopy)

Obv. 2 1/2 ma-na síg na₄ 「gi-na」

kù-bi 12 1/2 gín 16 še

「ri-lam」 5 ma-「na」 a-na 1 gín

ša síg ša é-gal

šdingir-šu-ib-ni ugula dam-gàr

i-ša -gal im-ḥu-ru

kdingir-šu-ib-ni ugula dam-gàr

^{1d}8ru-ba-ni ¹í-lí-ki-ma-a-bi-ia
⁹ip-qá-tum
¹⁰mu-meš ta-ri-bu-um
¹¹ba-an-ti-meš
¹²um é-gal i-ir-ri-šu
¹³babbar i-lá-e-meš
Rev 14 ¹⁴den-zu-ma-gir dumu den-zu-i-din-¹⁵nam
¹⁶šu-mu-um-lí-ib-ši
¹⁷mu¹⁸ sig¹⁹-i-lí-šu
¹⁷gi¹⁸ dšeš-ki-ma-an-šum¹⁹ dub-sar
¹⁸šu-numun-na u¹⁹-¹⁴-kam
¹⁹am-mi-di-ta-na lugal-e
²⁰GÀR? ¹⁹x²⁰ me-ta ¹⁹x x x
¹⁷am-mi-di-ta-na xx

Seals 1 legend illegible (Rev left)

seal 2 no legend (Rev right, LoE, LeE bottom2, RiE bottom2)

seal 3 no legend (LeE top1, RiE top1)

seal 4 legend [...] / dumu i-lí-[...] / [ir ...] (LeE top2, RiE top2)

seal 5 legend illegible (LeE bottom1, RiE bottom1)

13 30 kišib dutu-ba-ni (LeE top1)

13 40 kišib i-lí-ki-ma-[a-bi-ia] (LeE top2)

Translation

(1) 1 talent 2½ minas of wool (weighed) with the normal weigh-stone, (2) its silver (is) 11⅔ shekels 16 grains (3) the rate (is) 5 minas for 1 shekel, (4) part of the wool from the palace, (5) that Ilšu-ibni, overseer of the merchants (6) received in the palace, (7) (and that) from Ilšu-ibni, overseer of the merchants, (8) Šamaš-bani, Ili-kima-abiya (9) and Ibqatum, (10) sons of Taribum (11) have received. (12) The day the palace demands the silver, (13) they must pay the silver. (14–17) witnesses (18–21) date.

Remarks

Rev 20: The second line of this year-name is very badly preserved. After collation, Horsnell³⁹ reads A? GÀR? ¹⁹x²⁰ me-ta ¹⁹x x x²⁰ and adds that the interpretation and identification of this year-name with Ad 22 is quite uncertain.

3.

museumnr: BM 80636

date: Ad 23–vii–06

reference: Charpin 1982, 31

¹ma-na síg na⁴ ¹nam² ³[ha-ar-ti é-gal]
²síg ša é-gal
³dingir-šu-ib-ni ugula [dam-gàr]
⁴é-gal im-hu-[ru]
⁵ú-túl-iš⁸-tár [dub-sar] (sic!)
⁶di-in-nu-rum¹ [...]

^{1d}2n-zu-i-qi-ša-[am]
¹⁸h-hu-šu dumu-meš x [...]

⁹ba-an-¹ti² ³[meš]
¹⁰um é-gal kù-babbar i-[ir-ri-šu]
¹¹gin kù-babbar ka-an-¹kam?²
²na é-gal i-lá-e

Rev 13 ¹⁴den-zu-i-din-nam dumu in-bi-er-se-¹⁵tim¹⁶

14. *ri-ša-tum* na-aš-bar
 15. du -kù u₄.6-kam
 16. *am-mi-di-ta-na* lugal-e
 17. alan-alan- a -ni šūd-šūd?-dè?
 18. lamma dlamma kù -[sig₁₇] (sic!)
 19. habbar-ra-še [...]

Seals: 1: no legend (LoE, Rev)
 seal 2: no legend (UE, LeE, RiE)
 Seal 2 (LeE): *den-zu-i-qí-ša-am*

Translation

(1) 30 minas of wool (weighed) with the weight-stone for goods received by the palace, (2) part of the wool of the palace, (3) that Ilšu-ibni, overseer of the merchants (4) received in the palace, (5) from Utul-Ištar, scribe, (6) Nidinum, [PN], (7) Sîn-iqīšam (8) and his partners (litt.: brothers), the sons of [...] (9) have received. (10) The day the palace demands the silver, (11) 6 shekels of sealed silver (12) they must pay to the palace. (13–14) witnesses (15–19) date.

Remarks

Obv. 15 Whereas we would expect to read here ‘ni-šu Utul-Ištar dub-sar’ (goods (under the responsibility) of Utul-Ištar, scribe), followed by a line indicating the creditor ‘ki Ilšu-ibni, ugula dam-gàr’ (from Ilšu-ibni, overseer of the merchants), the scribe wrongly wrote ‘ki Utul-Ištar, dub-sar’ (from Utul-Ištar, scribe). The ki on line 5 make sense in combination with the preceding lines in which is stated that Ilšu-ibni, overseer of the merchants received the wool in the palace *from* the scribe Utul-Ištar. Having already written a ki, he than forgot to mention the creditor, a line also to be started with the sign ki. In other words, he made a mistake in writing ki instead of ni-šu before Utul-Ištar, and was then confused as there was already a line starting with ki and forgot to write the line mentioning the creditor. It does not make sense at all that Utul-Ištar, a palace scribe in Babylon, would be the creditor in this loan document, as it is stated that Ilšu-ibni, the overseer of the merchants in Sippar-Jahrūrum, already received the wool in the palace in Babylon and no doubt transported it to Sippar to lend it out to others. Why would creditors in Sippar lend wool received and transported to Sippar by Ilšu-ibni from a official in Babylon? The correct rendering of line 5 should be ‘ni-šu Utul-Ištar dub-sar’ followed by a line mentioning the creditor ‘ki Ilšu-ibni, ugula dam-gàr’.

Obv. 16 Charpin⁴⁰ reads *ni-di-in nu bar* [...]. Collation of the tablet shows this must be *ni-di-in-nu-rum* followed by another determinative preceding personal names, after which the personal name in question is unfortunately broken. The personal name Nidinum is attested in CT 45, 116 (sd).

Rev. 13 Charpin⁴¹ reads the father’s name of the first witness as in-bi-ia?. Collation of the tablet shows this must be *m-bi-er-se-tim*.

Rev. 14: that the second witness, the messenger Rišatum, is also mentioned in 6 *zehpum*’s⁴² presumably written by the palace scribe Utul-Ištar to Ilšu-ibni, overseer of the merchants (cf. *supra*) in which it is said that Rišatum was sent from Babylon to Sippar and Ilšu-ibni is asked to give the silver he owes the palace to Rišatum or to come to Babylon with Rišatum and to bring the silver.

Rev. 18 Charpin⁴³ reads the third line of this year-name *ù dlama-lama* [...], Horsnell⁴⁴ reads after collation *ù dlamma-dlamma kù* -[sig₁₇]. Collation of the tablet shows that there is no ù sign at the beginning of this line. Instead the scribe wrote igi followed by lama. Here again we witness the absent-mindedness of the scribe: he started writing an ù (composed of igi and dib) but stopped after the first part (igi) and then continued writing lamma omitting the determinative dingir. In other words, he forgot to write the second part of ù (dib) and the determinative dingir, no doubt because he mistakenly thought having

written a dingir (the igi) after which the lamma must follow. This proves again that scribes copied year formulae from other documents (lists?), which in some cases lead to the omission of signs or parts of signs by inattention.

4.

museumnr: BM 80644

date: Ad 24-iii-16

reference: Charpin 1982, 32

Obv. 31^{5/6} ma-na 2^{1/2} gín sig na₄ [...]
 k₂-bi 6^{1/3} gín 7^{1/2} še
 ša₃ sig ša₃ é-gal
 ša₃ dingir-šu-ib-ni ugula dam-gàr
 i-ba₃ é-gal im-hu-ru
 [na₄]-šu ú-túl-iš₈-tár dub-sar
 [na₄] dingir-šu-ib-ni ugula dam-gàr
 i-ba₃ di-ba-ri
 [na₄] dutu-ba-ni
 [na₄] [dumu]-meš e-tel-pi₄-dutu
 [na₄] -ba-an-ti-meš
 [na₄] -um é-gal
 [na₄] -babbar i -ir-ri-šu
 Rev. 7₁ -na [na-aš-] bar [é]-gal
 [na₄] -lá -e-meš
 [na₄] ú-ba-rum dumu dingir-šu-ib-ni
 [na₄] be-lí-ia -tum dumu dingir-šu-ba-ni
 [na₄] sig₄-a u₄ 16-kam
 [na₄] am-mi-di-ta-na lugal-e
 [na₄] giš₁₇ tukul-la kù-sig₁₇
 Upr. 1₁ [na₄] du₈-ši-a-bi
 2₂ é-sag-íl-la-še in-[ni]-in-ku₄ [...]

Seals: no legend (LoE, LeE, RiE)

seal 2: no legend (LoE)

seal 3: legend between figures [...] x bi (Rev)

Seal 1 (LoE): ir-di-ba-[ri]

Seal 2 (Rev): be-lí-ia-[tum?]

Translation

(1) 31 5/6 minas 2 1/3 shekels of wool (weighed) with the weight-stone, (2) its silver is 6 1/3 shekels 7 1/2 grains, (3) part of the wool of the palace, (4) that Išū-ibni, overseer of the merchants (5) received in the palace, (6) goods (under the responsibility) of Utul-lštar, scribe, (7) (and that) from Išū-ibni, overseer of the merchants, (8) Warad-Ibari (9) and Šamaš-bani, (10) sons of Etel-pi-Šamaš (11) have received. (12) The day the palace (13) demands the silver, (14) to the courier of the palace (15) they must pay. (16–17) witnesses (18–22) date.

Remarks

Obv. Charpin⁴⁵ reads 31 5/6 ma.na 2 1/3 gín. Collation of the tablet shows this must be 31 5/6 ma-na 2 1/2 gín.

5.

museumnr: BM 80422

date: Ad 25-v-25

reference: Charpin 1982, 32

Obv. ¹gú síg 𒀭na₄ 𒀭[...] [...]
š₂š₂ síg é-[gal]
š₂qá-ti ú-túl-iš₈-tár dub-sar
k₄dingir-šu-ib-ni ugula dam-gàr
^{1d}tu-ba-ni
ù₆r-i-ba-ri
d₇mu-meš e-tel-pi₄-^dutu
š₂ba-an-ti-meš
u₉um é-gal
k₆babbar i-ir-ri-šu
a₁na na-aš-bar é-gal
Rev. ²k₆babbar i-lá-e
i₅g₁den-zu-e-ri-ba-am
d₄mu ta-ri-ba-tum
i₅g₁i-din-^dnin-šubur
d₆mu ^den-zu-na-di-in-šu-mi
i₅g₁dnanna-ma-an-sum dub-sar
i₅g₁kin-^dinana u₄ -25-kam
i₅g₁am-mi-di-ta-na lugal-e
²⁰u₉ ús-sa šíta ^{gi}stukul-la 𒀭ib 𒀭[...] [...]
UE. ²¹š₂š₂ síg₁₇ ^{na}4du₈-šu-a

Seals: no legend (LoE, Rev, UE, LeE, RiE)

LeE, top): dutu-ba-ni

LeE, bottom): sin-e-ri-ba

Translation

(1) 1 talent of wool (weighed) with the [...] weight-stone, (2) part of the wool of the palace, (3) goods (under the responsibility) of Utul-Ištar, scribe, (4) from Išū-ibni, overseer of the merchants, (5) Šamaš-bani (6) and Warad-Ibani, (7) sons of Etel-pī-Šamaš (8) have received. (9) The day the palace (10) demands the silver, (11) to the courier of the palace (12) they must pay the silver. (13–17) witnesses (18–21) date.

6.

museumnr: BM 81582

date: Ad 26–viii-01

Obv. ¹ma-na síg
k₆-bi 2 gín 𒀭kù-babbar 𒀭
š₂š₂ síg é-gal-li
n₃šu ú-túl-iš₈-tár
š₂dingir-šu-ib-ni ugula dam-gàr
i₆hu-ru
i-^{na} qá-ti dingir-šu-ib-ni-šu
LoE. ²ugula dam-gàr
^{1r}di-in- <é> -ul-maš
Rev. ³k₆ub-bu-rum
a₁k₁na-tum dumu-meš [...]
š₂ba-an-ti-meš
u₉um é-gal kù-babbar i-ir-ri-šu
a₁na na-ši ka-ni-ki-šu-nu
k₆babbar i-lá-e-meš

16 den-zu-im-gur-an-ni
 17 ir-dingir-šu dub-sar
 U18a apin-du₈-a u₄.1-kam
 19a am-mi-di-ta-na lugal-e
 20a na-na-ni igi-du

Seals: seal 1 legend [...] / dumu [┐]x [┐] [...] -nu- [┐]x [┐] / ir [...] [┐]x [┐] (LoE)
 seal 2 no legend (LeE)
 seal 3 no legend (LeE)
 seal 4 no legend (LeE, RiE, UE)
 kišib 2 kišib dumu-meš [┐]den-zu-na [┐]šir (LeE, top)
 kišib 3 kišib sin- [┐]im-gur-a-ni [┐] (LeE, middle)
 kišib 4 kišib ir-i-lí-šu (LeE, bottom)

Translation

(1) 10 minas of wool, (2) its silver is 2 shekels, (3) part of the wool of the palace, (4) goods (under the responsibility) of Utul-Ištar, (5) that Išū-ibnišū, overseer of the merchants (6) received, (7) from Išū-ibnišū, (8) overseer of the merchants, (9) Niddin-Eulmaš, (10) Kubburum (11) and Kinātum sons of [...] (12) have received. (13) The day the palace demands the silver, (14) to the bearer of their tablet, (15) they must pay silver. (16–17) witnesses (18–20) date.

7.

museumnr: BM 81591
 date: Ad 37/vii/[...]
 reference: Charpin 1982, 33.

Obv: 1 gin kù-babbar [┐]na₄? [┐][du₂u?] [┐]
 2a 6 ma-na síg [é-gal]
 nBšu ú-túl-iš₈-tár dub-sar
 3a du₂tu-šu-mu-un-dib di-kud
 4a hu-ru
 k5 du₂tu-šu-mu-un-dib di-kud
 d7 mu dingir-šu-ib-ni
 18 wi-ra-ah
 LoB: 9a mu é-kur-ra-bi
 10a ba-an-ti
 Re: 1 [┐]um i-ir-ri-šu-ma
 2 [┐]na na-ši ka-ni-ki-šu
 k3 babbar i-lá-e
 14a mar-tu-na-ší-ír dumu mat-tum
 15a dingir-pi₄-iš₈-tár gala
 16 [┐]du₆ [┐][kù u₄-x-kam]
 17a am- [┐]mi [┐]-[di-ta-na lugal-e]
 UB: 8d [...] [┐]
 19a m-qí [┐]i [┐]-[li-šu ...]
 20a in- dù-a [┐][...]

Seals: seal 1 legend [...] / [┐]na-bi-[um] / [┐]x [┐]x x KA/SAG [┐]x [┐]/ki-ág [┐]x [┐] (impressed all over the tablet)

Translation

(1) 1 shekel of silver [(weighed) with weigh-stone of Šamaš?], (2) price of 6 minas of [palace] wool, (3) goods (under the responsibility) of Utul-Ištar, scribe, (4) that Utu-

šumundib, judge, (5) received (6) (and that) from Utu-šumundib, judge, (7) son of Ilšu-ibni, (8) Yawirah, (9) son of Ekur-rabi (10) has received. (11) The day (the palace) demands (it), (12) to the bearer of his tablet, (13) he must pay silver. (14–15) witnesses (16–20) date.

A.2. Short-term palace wool loans: silver or barley to be repaid within a set period

1.

museumnr: BM 79802

date: Aš 02–vi-[...]

reference: TLOB table 1

Obv. 1 ma-na síg
 2 šám 1 gín kù-babbar
 3 šám é-< gal> -líl
 4 ši-šu ú-túl-išg-tár dub-sar
 5 [i] i-din -dē-a di-kud
 6 hu-ni lú-túg?
 7 [dumu ...]-im
 8 [i]-ba-an-ti
 9 na iti-1-kam
 10 na na-ši ka-ni-ki-šu
 11 kù-babbar i-lá-e
 12 den-zu-tal-lik
 13 mu i-lí-sukkal
 UR 14 kin-dinnin u₄-x -kam!
 15 am-mi-ša-du- qá lugal-e
 16 ša an den- líl

Seals: 1: no legend (LoE, RiE, LeE)

kišib b (LeE): kišib a-hu-ni

Translation

(1) 6 minas of wool, (2) the price (is) 1 shekel of silver, (3) part of the sale of palace (wool), (4) goods (under the responsibility) of Utul-Ištar, scribe, (5) from Iddin-Ea, judge, (6) Ahuni, fuller (7) [son of ...] (8) has received. (9) Within one month, (10) to the bearer of his tablet (11) he must pay silver. (12–13) witness (14–16) date.

Remarks

Obv. 12 Richardson⁴⁶ reads šà šám é-gal. Collation of the tablet shows this line reads šà šám é ni, which can only be interpreted as šà šám é-< gal> -líl in this context.

LoE 16 name of the debtor is completed on the basis of the kišib written on the top LeE (kišib a-hu-ni). The reading of lú-túg is uncertain. There is, however, a fuller called Ahuni, son of Bur-Adad known from Di 859 (Aš 12–vii-[...]), which might be the same person.

2.

museumnr: BM 78633

date: Aš 04–viii-02

reference: TLOB table 1

Obv. 10. še-gur šibán dutu
 2 šám síg ša é-gal
 3 nŠu ú-túl-išg-tár dub-sar
 4 i-din -dē-a di-kud dumu ib-ni-dutu im-hu-ru
 5 i-din -dē-a di-kud

^{Id}6n-zu-na-di-in-šu-mi
^d7mu damar-utu-na-ši-ir
^{LoE}8ba-an-ti
^u9buru¹⁴-še
^{Re}10-[na na-ši ka-ni-ki-šu]
¹¹11e-am i-[ág-e]
¹²12gi [... dumu ...]-x i-din-nam
¹³13gi [... dub]-sar
¹⁴14apin-duš-a u⁴-2-kam
^U15am-mi-ša-du-qá lugal-e
^d16mar-utu en gir-ra
¹⁷17nir gal-gal-la

Seals 1 legend: [...] x [...] / [...] / [ir ^den/šeš?]-ki ^d[...] (Rev)
 seal 2 legend between figures: [...] / dumu dingir[...] (LoE, RiE, LeE)
 kišib 2 illegible [probably first witness] (LeE, lower side)

Translation

(1) 4 gur of barley (weighed) with the wooden bán measure of Šamaš, (2) part of the sale of palace wool, (3) goods (under the responsibility) of Utul-Ištar, scribe, (4) that Iddin-Ea, judge, son of Ibni-Šamaš received, (5) from Iddin-Ea, judge, (6) Šin-nādin-šumi, (7) son of Marduk-nāsir (8) has received. (9) At harvest time, (10) to the bearer of his tablet, (11) he must deliver barley. (12–13) witnesses (14–17) date.

3.

museumnr: BM 81236
 date: Aš 09-[...]-19
 reference: TLOB table 1

^{Of}15 gín kù-babbar
²2an 1 gú síg-šu
³3i ú-túl-iš₃-tár a-bi érin
⁴4-na qá-bé-e dingir-šu-ba-ni dumu dm^gir-šu-ib-ⁿⁱ ni ugula dam-gàr
⁵5-el-šu-nu dumu ib-na-tum
⁶6-lí-a-tum dumu a-at-^{ta}ta-a
⁷7 gaz-dingir dumu ib-ni-^diškur
⁸8ba-an-ti-meš
^{LoE}9a iti-1-kam
^{Re}10-[na na-ši ka-ni-ki-šu-nu
¹¹11babbar i-lá-e-meš
¹²12ib-ni-^dmar-tu dumu šu-mu-^{um}um -li-ib-ši
¹³13amar-utu -mu-ša-lím dumu ta-ri-ba-tum
¹⁴14den-zu-mu-ša-lím dub-^{sar}sar
¹⁵15i [...] u⁴-19-kam
¹⁶16mu am-mi]-^{sa}sa -du-qá lugal-e
^U17utu en] an -^{ta}ta gál-la
¹⁸18an] nam-nir .gál-la-ni zubi

Seals 1 legend den-zu-[...] / x x x [...] / dingir ezen x x [...] (LoE)
 seal 2 legend [...] x x -ni / [...] -^damar.utu / [...] (Rev, left)
 seal 3 legend ha-a-^{ia}ia [...] / dumu i-^xx [...] / [...] (Rev, right)
 seal 4 legend [...] x [...] / [dumu] ib-ni-^d[...] / [ir d[...]] / ù ^dnin.[...] (LeE top, RiE)
 seal 5 no legend (LeE, lower side)
 kišib 5a kišib be-lí-tum (LeE bottom)

Translation

(1) 15 shekels of silver (2) price of 1 talent of his wool, (3) from Utul-Ištar, abi érin, (4) replaced by Ilšubani, son of Ilšu-ibni, overseer of the merchants, (5) Bēlšunu, son of Ibnatum, (6) Bēliyatum, son of Atta, (7) and Gaz-ilum, son of Ibni-Adad (8) have received. (9) Within 1 month, (10) to the bearer of their tablet, (11) they must pay silver. (12–14) witnesses (15–18) date.

Remarks

Obv. Richardson⁴⁷ reads *síg* [x]. Collation of the tablet shows this must be *síg-šu*.

4.

museumnr: BM 81196

date: Aš 09–iii-08

reference: *TLOB* table 1

Obv. 40.ma-na *síg*
 10 gín kù-babbar
 8 *sám* *síg* é-gal
 k¹ú-túl-iš₈-tár a-¹bi¹ [érin]
 10¹na-bi-um-[...]
 6¹mu [ib-ni-...]
 Lo 7¹ba¹ [an-ti]
 a⁸na¹ iti¹ [x-kam]
 Re 9¹na na-ši [ka-ni-ki-šu]
 10¹babbar i-lá-[e]
 11¹i sig₄-a u₄-8-kam
 12¹am-mi-ša-du-qá lugal-e
 U 13¹an nam-nir-gál-la-an

Seals: seal 1 legend ⁴na-bi-¹um¹-[...] / *dumu ib-ní*-[...] / *ir den*.[zu] (LoE, Rev, UE, LeE, RiE)

Translation

Obv. (1) 40 minas of wool, (2) the price (is) 10 shekels silver, (3) part of the sale of palace wool, (4) from Utul-Ištar, abi érin, (5) Nabium-[...], (6) son of Ibni-[...] (7) has received. (8) Within x month(s), (9) to the bearer of his tablet, (10) he must pay silver. (11–13) date.

5.

museumnr: BM 80990

date: Aš 09–iv-10

reference: *TLOB* table 1

Obv. 20.gín kù-babbar
 8 *sám* 8 ma-na *síg*
 8 *qá-ti* ú-túl-iš₈-tár a-bi érin
 10¹am-har-ti
 k¹dingir-šu-ba-ni di-kud *dumu dingir-šu*-¹ib-ni¹
 u⁶gula dam-gàr
 10¹amar-utu-mu-ba-lí-i¹ *dumu dingir-šu-ba-ni*
 Lo 13¹ba-an-ti
 a⁹na iti-1-kam
 Re 9¹na na-aš¹ka¹ *ni-ki-šu*
 10¹kù-babbar i-lá-e
 12¹den-zu-eri₄-ba-am *dumu utu-šar-i-lí*
 13¹ir-ku-bi *dumu be-el*-[šu-nu]

14. ri-iš^d-utu dumu i-l[-...]
 15. šu-numun-a u₄-10-kam
 16. hu am-mi-ša-du-qá lugal-e
 17. utu en an-ta gál-la
 18. en nam-nir- gál -la- ni

Seals 1 legend damar-utu-[-...] / dumu dingir-šu-[-...] / ir^d[-...] / ù^d[-...] (Rev, LoE, LeE, UE, RiE)

Translation

(1) 2 shekels of silver, (2) price of 8 minas of wool, (3) goods (under the responsibility) of Utul-Ištar, abi érin (4) received, (5) from Ilšu-bani, judge, son of Ilšu-ibni, (6) overseer of the merchants, (7) Marduk-muballit, son of Ilšu-bani (8) has received. (9) Within one month, (10) to the bearer of his tablet, (11) he must pay silver. (12–14) witnesses (15–18) date.

6.

museumnr: BM 81004

date: Aš 13–viii-28?

reference: TLOB table 1

Obv 1 ma-na^d síg^d
 2 am 1 gín kù-babbar
 3 ša^d šam šíg^d ša é-gal
 4 ni^d šu i-din-na^d -bi-um sag/ka x x x
 5 k^d sa-al-lu- hi dam-gàr é-gal
 6 umu i^d -din-utu
 7 i^d iš^d-tár
 8 mu dingir-šu-ba-ni
 9 ba-an-ti
 Rev 10 na] iti^d -1- kam^d
 11 na na-ši ka-ni-ki-šu
 12 babbar i-lá-e
 13 ib-ni^d amar-utu dumu^d utu-na-ši-ir
 14 gi den-zu-i-din-nam^d dumu be-el-šu- nu^d
 15 apin-du^d-a u₄- 28? -kam
 16 am-mi-ša-du-qá [lugal-e]
 17 du^d ki-lugal-gub i-mah- a^d
 18 ur- sag i^d-didli-a

Seals 1 no legend (LeE, RiE)

seal 2 no legend (LeE, RiE)

seal 3 no legend (LeE, RiE)

Seals 1 mu-iš^d-tár (LeE, top)

Seal 2 ib-ni^d amar-utu (LeE, middle)

Seal 3 [den-zu]-i-^d din^d -nam (LeE, bottom)

Translation

(1) 7 minas of wool, (2) the price (is) 1 shekel of silver, (3) part of the sale of palace wool, (4) goods (under the responsibility) of Iddin-Nabium, ... (5) from Salluhi, dam-gàr é-gal (6) son of Iddin-Šamaš, (7) Awil-Ištar, (8) son of Ilšu-bani, (9) has received. (10) Within one month, (11) to the bearer of his tablet, (12) he must pay silver. (13–14) witnesses (15–17) date.

Abbreviations

- AbB 1 Kraus, F. R. (1964) *Briefe aus dem British Museum (CT 43 und 44)*, Leiden: Brill.
- AbB 2 Frankena, R. (1966) *Briefe aus dem British Museum (LIH und CT 2–33)*, Leiden: Brill.
- AbB 3 Kraus, F. R. (1977) *Briefe aus dem British Museum (CT 52)*, Leiden: Brill.
- BBVO 4 Thureau-Louis, D. (1889) *Altbabylonische Rechts- und Verwaltungsurkunden*, Berlin.
- BDH 5 Waterman, L. (1916) *Business Documents of the Hammurapi Period from the British Museum*, London.
- CT 6 Pinches, T. G. (1898) *Cuneiform Texts from Babylonian Tablets in the British Museum, Part VI*, London.
- CT 8 Pinches, T. G. (1899) *Cuneiform Texts from Babylonian Tablets in the British Museum, Part VIII*, London.
- CT 49 Sankelstein, J. J. (1968) *Cuneiform Texts from Babylonian Tablets in the British Museum, Part XLVIII, Old Babylonian Legal Documents*, London.
- OLA 51 Van Lerberghe, K. (1986) *Old Babylonian Legal and Administrative Texts* Philadelphia, Louvain.
- TLO 52 Richardson, S. F. C. (2010) *Texts from the Late Old Babylonian Period, JCS Suppl. series 2*, Boston.
- TJD 53 Zechter, E. (1958) *Tablettes juridiques de la 1ère dynastie de Babylone conservées au Musée d'art et d'histoire de Genève*, Paris, Recueil Sirey.
- VS 2 Klengel, H. and Klengel-Brandt, E. (2002) *Spät-altbabylonische Tontafeln, Texte und Siegelabrollungen*, Mainz an Rhein.

Bibliography

- Charpin, D. (1982) Marchands du palais et marchands du temple à la fin de la 1re dynastie de Babylone. *Journal Asiatique* 270, 25–65.
- Horsnell, M. J. A. (1999) *The Year-Names of the First Dynasty of Babylon (2 volumes)*. McMaster University Press.
- Kraus, F. R. (1966) *Staatliche Viehhaltung im altbabylonischen Lande Larsa*. Amsterdam.
- Renger, J. (2000) Das Palastgeschäft in der altbabylonischen Zeit. In A. C. V. M. Bongenaar (ed.), *Interdependency of Institutions and Private Entrepreneurs*, 153–183. MOS 2. Istanbul.
- Richardson, S. F. C. (2010) *Texts from the Late Old Babylonian Period, JCS Suppl. Series 2*, Boston.
- Skaist, A. (1994) *The Old Babylonian Loan Contract. Its History and Geography*, Bar-Ilan University Press.
- Stol, M. (1999) Nach dem Gewichtsstein des Šamaš. In B. Böck, E. Cancik-Kirschbaum and T. Richter (eds), *Munuscula Mesopotamica. Festschrift für Johannes Renger*, 573–589. Münster: Ugarit-Verlag.
- Stol, M. (2002) Personen um den König in altbabylonischer Zeit. In O. Loretz, K. Metzler and H. Schaudig (eds), *Ex Mesopotamia et Syria Lux: Festschrift für Manfred Dietrich zu seinem 65. Geburtstag*, 735–758. AOAT 281. Münster: Ugarit-Verlag.
- Stol, M. (2004) Wirtschaft und Gesellschaft in Altbabylonischer Zeit. In D. Charpin, O. Edzard and M. Stol, *Mesopotamien. Die altbabylonische Zeit*, 643–978. OBO 160/4. Fribourg-Göttingen: Academic Press-Vandenhoeck and Ruprecht.
- Tanret, M. (forthcoming) Gimil-Marduk. Une carrière de juge ou un juge de carrière? (in *Festschrift Tunca*).
- Van De Mieroop, M. (2002) Credit as a Facilitator of Exchange in Old Babylonian Mesopotamia. In M. Hudson and M. Van De Mieroop (eds), *Debt and Economic Renewal in the Ancient Near East*, 163–173. ISCANEE 3, Bethesda: CDL Press.
- Yoffee, N. (1977) *The Economic Role of the Crown in the Old Babylonian Period*, BiMes 5, Malibu.

1 A recent overview of what is known about wool in the Old Babylonian period is to be found in Stol 2004, 955–972.

2 Charpin 1982.

3 Van de Mieroop 2002.

4 AbB 2, 48, 49, 50, 51 and 52 and AbB 7, 32. Two other letters, AbB 1, 83 and 84, are written by Šin-iqīšam in which he informs the addressees (Akkiya in AbB 1, 83 and the sons of Ibni-Šin, son of Marduk-nāšir in AbB 1 84) that a letter from his master [i.e. the king] has been sent to them in which

they are summoned to organize the transport of the sheep he herds, to bring the receipts of the sheep he booked as losses and to come to Babylon within the set term.

5 Marduk-nāšir and a person whose name was broken in Abb 2, 50, and Ibni-Sîn, son of Marduk-nāšir in Abb 2, 48, 49, 51 and 52.

6 In the letters mentioned above, the day the herdsmen have to bring their flocks to Babylon is specified: 25-xi (Abb 1, 83: 9), 20-xi (Abb 1, 84: 22), 01-xii (Abb 2, 48: 17), 10-xi (Abb 2, 49: 17) and

6 + x -xi (Abb 2, 52: 17). This shows the sheep had to be brought to Babylon in January/February.

7 This is shown by 3 letters (Abb 7, 160, 161 and 162) which are actually *zehpum*'s or short notes without sender or addressee, but it seems very plausible that they were sent by the palace scribe Utul-İštar in Babylon to İlšu-ibni, the overseer of the merchants in Sippar-Jahrürum, cf. already Charpin 1982, 27, note 11.

8 Van De Mieroop 2002, 164.

9 Van De Mieroop 2002, 165.

10 Abb 1, 83 and 84, Abb 2, 48, 49 and 52.

11 Charpin 1982, 28.

12 Van De Mieroop 2002, 166.

13 Charpin 1982, 33, n. 23.

14 VS 29, 86 (Ad [...]), VS 29, 70 (Ad 22), BM 80636 (Ad 23), BM 80644 (Ad 24), BM 80422 (Ad 25), CT 8, 36a (Ad 26), *BDHP* 19 (Ad 29), CT 6, 37c (Ad 29), CT 8 11c (Aş 1), CT 8 21a (Aş 13) and CT 8, 30b (Aş 13).

15 OLA 21, 70 (Ad 29), CBS 1196 (Ad 30), CT 6, 35c (Aş 2), OLA 21, 47 (Aş 2), BM 79802 (Aş 2), BM 78633 (Aş 2), BBVOT 1, 132 (Aş 4), *TLOB* 28 (Aş 7), BM 81236 (Aş 9), BM 81196 (Aş 9), BM 80990 (Aş 90) and BM 81004 (Aş 13).

16 BM 81582 (Ad 26) and BM 81591 (Ad 37).

17 CT 48 119 (Aş 1).

18 According to 6 letters or *zehpum*'s (Abb 2, 172, Abb 7, 160, 161, 162, 163 and 164) probably written by the palace scribe Utul-İštar in Babylon to İlšu-ibni, the overseer of the merchants in Sippar-Jahrürum (cf. *supra*), the courier (na-aš-bar) of the palace was called Risatum. The same Risatum is also mentioned in the wool loan document BM 80636 (Ad 23) as second and last witness and in CT 48, 101 (Ad 32), a delivery of sheep as offering in return for the use of a pledged person during one month, as first witness. The letters show indeed that the addressee (İlšu-ibni, the overseer of the merchants in Sippar-Jahrürum) is bound to give the silver to the courier or to come to Babylon with the courier to bring the silver.

19 Abb 2, 172, Abb 7, 163 and 164.

20 Cf. Charpin 1982, 42.

21 Cf. Charpin 1982, 42.

22 Skaist 1994, 191.

23 Van De Mieroop 2002, 166.

24 Stol 2004, 879–880.

25 Charpin 1982, 28.

26 See the comment on VS 29, 86: 13' *sub* Texts A.A1.1.

27 For this high palace official cf. Renger 2000, 170–177, Stol 2002, 742–753 and 2004, 919–944.

28 İlšu-ibni is attested as overseer of the merchants from Ad 5 to Ad 27 whereas his son is attested first as judge from Ad 24 to Aş 2 then as overseer of the merchants from Aş 4 to Aş 17.

29 Cf. *CAD* Š/3 *sub* šisu (*tisu*) 2. summons.

30 *TJDB* 38–39: (1) 1 gín kù-babbar ([...]) (2) šam 2 bán? i- giš ([...]) (3) ki ú-túl-iš-tár a-bi [erén] (4) ib-na-tum dumu a- da [tum] wa- ši-ib ud-kib-nun^{kl}-am- na-ni (5) šu-ba-an-ti (7) a-na 10 u₄-ni (8) a-na-na-ši-ka-ni-ki-šu (9) 1 gín kù-babbar (10) i -[lá-e] (11–12) witnesses (13–15) date “1 shekel of silver, the price of 20 litres of sesame oil, from Utul-İštar, *abi* erén, Ibnatum, son of Adatum, inhabitant of Sippar-Amnânium, has received. Within 10 days, to the bearer of his tablet, 1 shekel of silver he must pay”.

31 Stol (2004, 932) believes the servant line of Ibni-Šamaš's seal, impressed on BE 6/1, 88, to be ir é-ba[bbar] ‘servant of the Ebabbar’. However, the copy of the seal legend in BE 6/1, 88 shows the servant line to be ir é[-...] which can only be ‘servant of Ea’. Stol (1999) believes Ibni-Šamaš's title to be mentioned on CBS 1196: 5: LA/uru? NIM/ki?. The photograph of CBS 1196 on www.cdli.ucla.edu shows lines 4–5 must be read: ša den-zu-iš-ma-an-ni ù ib-ni-đutu dumumeš a-wi-li-ia im-hu-ru ‘that Sîn-išmeanni and Ibni-Šamaš, sons of Awiliya received’.

32 See Stol 2004: 932 (with references) for these brothers.

33 Tanret *forthcoming*, contra Yoffee 1977: 20. See Tanret *forthcoming* for these brothers.

34 BM 81582 does not explicitly state he received the wool at the palace (ll. 5–6: ša dingir-šu-ib-ni ugula

dam-gàr *im-hu-ru* that Ilšu-ibni, overseer of the merchants, received'), but it seems quite logical that he received it there taking into account his function and what the letters show.

35 Again, the text does not explicitly state he received the wool *at the palace*, but we can assume this was the case.

36 CT 48, 72: (1) 15 ma-na kù-babbar (2) *ša i-na* 1 ma-na-e 4 gín igi-6—gál *mah-ru* (3) *ša a-na* ^{gi}pisan é-gal *ik-kam-sú-ma* (4) *a-di-ni ka-ni-ik* é-gal *la i-ka-an-na-ku* (5) *ša kù-babbar šám sig amar mu-3* ù *še-giš-i* (6) *ši-ta-at ša mu šita* ^{giš}tukul-la-^{ib} ^{ib}-diri-ge-eš-a (7) ù *ša-ša mu ús-sa šita* ^{giš}tukul-la (8) *ša i-na* é-gal *im-hu-ru* (9) *ša qá-ti-[šu-nu]* (10) mu-[DU] (11) ^{id}utu-šu-mu-un-dib di-^{id} kud (12) ù *e-ṭi-rum* *dumu sà-ni-iq-pi₄* -[^{id}utu] (13) *ša kar ud-kib-nun^{ki}-ia-ah-ru-rum* (14) *nam-ha-ar-ti* (15) ^{id}en-zu-*im-gur-an-ni* *dumu [é]-dub^{ba}-a* (16–19) date '15 minas of silver, of which 1 mina 4 1/6 shekels has already been received, that has been gathered for the box of the palace, and for which hitherto no sealed tablet from the palace has been drawn up, part of the silver of the sale of the wool, the three-year-old oxen and the sesame, remnant of the 24th year of reign of Ammiditana and part of the 25th year of reign of Ammiditana, that they received in the palace, that were under their responsibility: delivery by Utu-šumundib, judge, and Eṭirum, son of Saniq-pi-Šamaš, from the *kārum* of Sippar-Jahrūrūm; received by Sin-imguranni, scribe'.

37 Kraus 1966.

38 All tablets have been studied and/or collated in the Vorderasiatisches Museum Berlin (May 2010) and in the British Museum (January 2013). I would like to thank Joachim Marzahn, Curator of the Cuneiform Collection of the Vorderasiatisches Museum Berlin as well as John Taylor, Assistant Keeper in the Department of the Middle East of the British Museum for the opportunity to study these tablets. I thank the Trustees of the British Museum for the permission to publish these texts.

39 Horsnell 1999, 300, n. 100.

40 Charpin 1982, 31, n.20.

41 Charpin 1982, 31, n. 20.

42 AbB 2, 172 and AbB 7, 160, 161, 162, 163 and 164.

43 Charpin 1982, 31, n. 20.

44 Horsnell 1999, 302.

45 Charpin 1982, 32, n. 21.

46 Richardson 2010, 22.

47 Richardson 2010, 22.

13. Wool Trade in Upper Mesopotamia and Syria According to Old Babylonian and Old Assyrian Texts

Cécile Michel

As one of the basic commodities produced in Ancient Mesopotamia, wool is mentioned in all kinds of contexts. Every palace or private house had a stock of wool; weaving was the main activity of women both at home and in large institutional specialized workshops.¹

However, our knowledge of trading in wool varies according to the nature of the available sources. For example, large quantities of wool were used daily by Assyrian women in Aššur producing textiles for their households and for long distance trade with Anatolia. Erišum I, king of Aššur claimed, in an inscription, to have set up a free traffic of goods traded by inhabitants of Aššur: 'silver, gold, copper, tin, barley, and wool, down to bran and chaff'.² But the Old Assyrian documentation found essentially at Kültepe (near Kayseri in modern Turkey) refers almost exclusively to wool traded inside Anatolia, where it was often used as a mean of exchange.

The origin of the wool sold on the Aššur market is given by the Mari royal archives. These, as well as some few texts from Qaṭṭarā, Harradum or Šubat-Enlil (northern Iraq and Syria), offer a detailed picture of the supply of palaces with wool and the various uses made of it.³ Combining the data offered by these different cuneiform corpuses, this paper explores various aspects of the wool trade in Upper Mesopotamia and Syria during the 19th and 18th centuries BC: wool provenance and transport, the process from sheep to wool, wool trade in the private and institutional spheres, and its management by the wool office, qualities and prices of wool, as well as its uses.

1. Provenance of wool

According to the many place names mentioned in connection with textiles in the Old Assyrian texts, Assyrian merchants traded textiles produced in southern Mesopotamia and in Aššur, but also in northern Syria, in Upper Mesopotamia and in Anatolia. We have previously shown that when a geographical name qualifies a textile, it does not necessarily mean that this textile was a local product, manufactured in a specific town, but it could also refer to a particular technique that was reproducible somewhere else, or to the material used, i.e. wool, produced

in a specific area.⁴ The same may be applied to textiles cited in the Mari texts in connection with geographical names.⁵

The important textile production of Aššur used large quantities of wool.⁶ Some inhabitants or institutions may have owned herds of sheep; nomads certainly grazed their flocks at least once a year near the city where one could find pastures. Texts give little information on how the women of Aššur got the wool they needed, and where this raw material came from. The most common type of fabric produced by the Aššur women and exported to the West was the *kutānum*-textile which could be weaved with *šurbiūm* wool. This expensive type of wool is only mentioned in letters when it is lacking on the Aššur market.⁷ It originated from the city of Šurbu, known both from 3rd millennium sources, and a geographical list from the early 2nd millennium BC found at Tell Harmal.⁸ Šurbu was located in the Hamrin Mountains, Southeast of Aššur, in an area well-known for sheep breeding (Fig. 13.1).

The Mari royal archives give more details about the origin of wool sold on the Aššur market during the 18th century, and explain why it could be lacking. In a letter sent to the king of Mari, Meptūm, a high official, proposed that the plucking of the sheep should take place, not as it used to be, in Aššur where inhabitants could buy wool for money and grain directly from the pastoral nomads, but where the flocks were grazing, in the Suhūm, Southeast of Mari, thus forcing Aššur inhabitants to go there to buy the wool they needed: "The plucking (of sheep) from Suhūm must be done here, so that the Aššur people come and it must be here that they take the wool".⁹ The sheep were usually brought to Aššur, to be plucked there, following the Wadi Tharthar where they could graze on their way. As Mari was at war with Ešnunna, which annexed Aššur and Ekallātum, the decision was taken to control the populations of the Suhūm, and to be informed of their contacts with the Assyrians (Fig. 13.1). The seasonal migration of livestock was blocked and no more herds came to Aššur. In a second letter, we learn that Assyrians complained about the Suhūm people who prevented access for their traders and the sheep, and thus the wool.¹⁰ Other texts from Mari show that the palace used to buy wool or goat hairs to Suhūm inhabitants.¹¹

An important part of the textiles exported by the Assyrians to Anatolia was bought from the Babylonians; these textiles, which were called Akkadian textiles, were sometimes in short supply on the Aššur market, again because of political troubles: "As for the Akkadian textiles you wrote about, since you left, Akkadians have not entered the city, their country is in revolt".¹² Owing to the distance and cost of transport, the quality of textiles from southern Babylonia was highly regarded. The reputation of Babylonian fabrics was based on the quality of weaving, no doubt enhanced by the excellence of their wool. In Mari, we learn from Mukannišum letters that Babylonian wool was needed to produce luxury textiles.¹³ Among the varieties of wool imported from Babylon was the precious *tuhšūm*-wool; when the caravans from Babylon could not travel, this type of wool was difficult to obtain to finish a garment to wear for Ištar's sacrifice ceremony.¹⁴

According to a letter sent by Amat-Šamaš, a priestess of Šamaš living in Sippar, to her sister Iltani, the wife of Karana's king who used to live in Qaṭṭarā, people from the Sinjar area appreciated good quality wool from Sippar: "Now, I just sent you as a honorific present, [x +]5 minas of first quality white wool for your peruke and a basket of shrimps".¹⁵

One could also find wool further north and west, along the Euphrates. Texts from Harradum, East of Mari, show that this city represented a meeting place for nomads who came there to sell their sheep and their wool.¹⁶ Wool was found in Mari, also sold there by pastoral nomads or coming from the palace flocks.¹⁷ It was sent to Mari from the whole territory: Terqa, Saggarâtum and Qaṭṭunân.¹⁸ In Terqa, Sammêtar governor's palace owned sheep which were producing first quality wool but also ordinary wool.¹⁹

Several documents from Mari and a text from Harradum witness wool transactions in Emar. A letter found in the house of the merchant Rîš-Šamaš at Harradum mentions the purchase of cereals and wool in Emar.²⁰ J.-M. Durand, who studied Emar activities viewed from Mari archives, has shown that this city was an important centre of commerce on the Euphrates.²¹ Emar served as a market place for exchange between Mari on one side, and Karkemiš and the Yamhad on the other side. Many animals were transiting through Emar, which became a big market for animals and their by-products. Merchants from Emar bought wool there and then transported some distance to sell it on. One of them sold no less than 50 talents of various qualities of wool for a very low price to the Mari palace.²² Another one, located at Dêr of the Balih, protested to the Mari authorities that his merchandise, including 30 minas of *tuhšûm*-wool, had been stolen.²³

Wool was also circulating within the Sinjar area, for example, from Qaṭṭarâ to Andarig.²⁴ And Qaṭṭarâ is the origin of a *nibrarum*-textile in an unpublished Old Assyrian document; this textile could have been made from local wool.²⁵ In the Habur triangle, the requirement for wool was also important within local administrations, but official archives from Chagar Bazar (Ašnakkum?) do not illustrate these aspects; they mainly concern the beer office. In Tell Leilan, designated as Šehna during the kingdom of Šamši-Adad, we find sheep from Amaz, another town of the Habur triangle. Later on, when the city was named Šubat-Enlil, the palace, which needed much wool, could buy it from merchants who were living in the nearby *kārums* of Šuna and Amursakku; the sheep had presumably been plucked in the vicinity.²⁶

Wool could occasionally be sent from quite far away when there was a shortage. When no more wool was available on Aššur market, women used to ask their husbands to send small quantities from Anatolia: "When you send the purse, enclose some wool (because) wool is expensive in the City".²⁷ Wool was then carried to Aššur on donkeys together with gold and silver.²⁸ Thus the text Prag I 554 mentions a shipment of silver to Aššur that includes "3 minas of wool for Waqqurtum".²⁹ The shipment of some wool from Anatolia may be explained by the existence of important wool markets southeast of Kaneš,³⁰ as Balihum, near the place where the Balih rises, at Hahhum,³¹ probably located at Samsat, at Timilkiya, near the modern city of Pazarcık, or at Hurrâma, in the area of Göksün. Luhusaddiya, between Elibstan and Pazarcık, was the most important production centre of textiles and wool of this area; and flocks were plucked nearby.³² Many texts witness the involvement of Assyrian merchants in the Anatolian wool trade.³³ But these wool shipments to Aššur remain rare and concern only small quantities of wool, because the cost of the transport would have been too expensive because of the length of the trip.

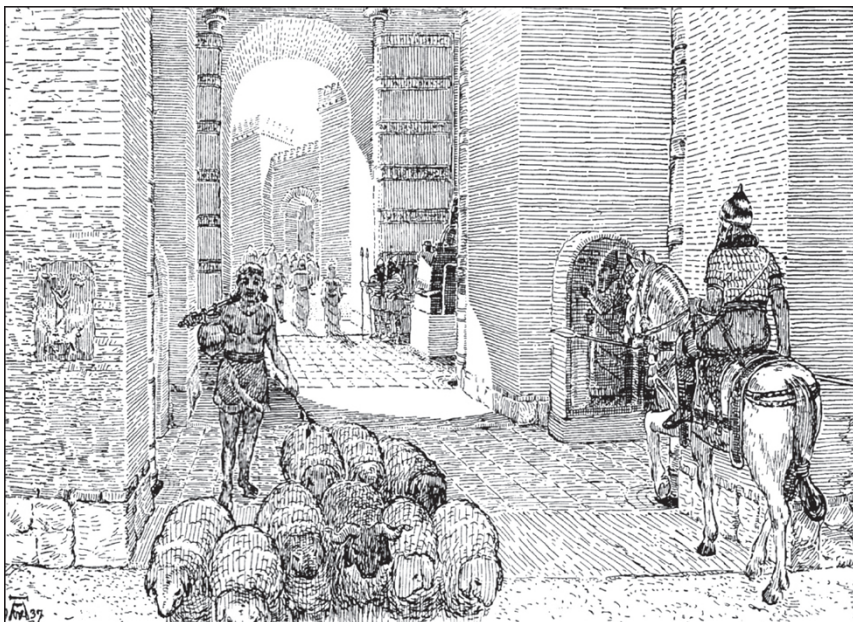


Fig. 13.2. Sheep arriving at Aššur, drawing by W. Andrae (From Andrae 1938, 8, Abb. 4).

2. Transport and preparation

A letter sent by the king of Karkemiš to Yasmah-Addu mentions a voyage of a boat on the Euphrates transporting 30 sheep and 50 jars of wine; this boat is stopped and retained at Tuttul. We do not know if these animals were transported for their wool, for their meat or both, but transport of sheep by boat is quite unusual.³⁷ As we learn from Mari letters, wool was usually transported directly to Aššur on the hoof, the herds being driven close to the city to be plucked (Fig. 13.2). As the herds were forbidden to move to Aššur because of war, they were plucked in the Suhûm where Aššur inhabitants had to go to buy the wool they needed. The cost of the transport of wool bundles on donkeys thus increased the price of the wool.

The transport of wool on donkeys is attested but not very frequently. A donkey is sent from Andarig to Qaṭṭarā, to transport back some wool and sesame oil.³⁸ The donkeys coming back from Kaneš to Aššur with consignments of gold and silver occasionally carried an additional 1.5 kg of wool (see above). An unpublished Old Assyrian document mentions a transport of wool and textiles; each of thirteen donkeys was loaded with 75 kg of wool packed in bales.³⁹ Raw wool or wool that was already treated was also packed into various types of textiles bundles or in leather bags.⁴⁰ After the collect of large quantities of wool on sheep belonging to the palace of Qaṭṭunān, the governor announced to Mari king that wool would be transported to Saggaraṭum on wagons.⁴¹

The collect of wool is well documented in the Mari archives; it took place once a year, in cool weather during spring, just before the harvest, as the herds were gathered in big pens.⁴² Before, this operation, the flock were washed. A letter concerning the North East of the upper Djezireh dated to the reign of Yasmah-

Addu details the operations;⁴³ these can be completed from older and later sources.⁴⁴ Washing the sheep removed the dust from their fleeces; males and females were bathed separately. One had to be very careful that, while bathing the sheep, the wool was not lost in the water. The wool was plucked (*qaṭāqum*) by hand;⁴⁵ this technique developed for the animals of that period had the advantage of preserving the fibres. This work had to be done quickly after the washing of the sheep so that the wool would not get dusty again and does not fall out. It was important to do it at the right moment, if waiting too long, the old fibres might be mixed with new growth. It was done by men and took some time. Several hundred men, chosen from the military, servants of the king, slaves and foreign workers were needed to pluck the sheep.⁴⁶ According to the Mari letters, 300 or 400 men should work for three days: this corresponds to about 10,000 plucked sheep.⁴⁷ As it was raining, the work had to be interrupted and thus could last some ten days.⁴⁸ When operations were delayed by the lack of ‘sheep pickers’, weavers were unemployed, waiting for the raw material.⁴⁹ The first sample of plucked wool would be sent to the king to assess its quality.⁵⁰ A text from Tell Leilān indicates that the palace would employ workers for the plucking: 1438 sheep, presumably belonging to the palace, were plucked by the semi-nomadic Hana people for a fee of 1 shekel of silver for each 7 or 8 sheep.⁵¹

A sheep produced an average of 2 minas i.e. 1 kg of wool. Administrative documents from Mari register either the plucking of various groups of sheep⁵² or receipts of the wool produced by plucking the sheep: “15 minas of first quality wool, 1 talent of second quality wool, 6 talents and 50 minas of ordinary wool. Total: 8 talents 5 minas of wool, product of the plucking of the ewes, that we have enter to (stored in) the sealed room when the plucking (was completed) at Qaṭṭunān”.⁵³ This amount of wool corresponds to about 242 ewes. Smaller numbers of sheep could be plucked at once. An administrative text records the plucking of a single sheep in the palace court of Mari; its first quality wool, i.e. 2 minas $\frac{2}{3}$ (1.3 kg) was given to three male weavers and a female weaver, perhaps for a specific task.⁵⁴

After being collected, the wool was sorted before being weighed, packed in bundles, and entrusted to the weavers.⁵⁵ It was delivered, often as raw wool, immediately after plucking,⁵⁶ but some small quantities were cleaned up by female workers, removing dust (*eperum*) and waste wool (*nuqārūm*).⁵⁷ These operations could considerably reduce the weight of the wool. As well, some records mention the selection of the best quality wool from the fleece: from about 1.5 kg of wool, only 93 g of *tuhšūm*-good quality wool remained after cleaning.⁵⁸ In the palace workshops as well as in private houses, the wool was first ‘aired’ (*napšatum*; i.e. the wool fibres were separated);⁵⁹ this airing process would have been done with sticks.⁶⁰ Then the wool was disentangled and cleaned by teasing (*pus/šikkum*), an operation done by hand.⁶¹ Finally, it could be combed (*mašādum*).⁶² It was then spun into a thread and woven. The dyeing process was applied only to woven fabrics.⁶³

3. The circulation of wool

The circulation of wool may be analyzed from a private or an institutional perspective. The first is documented by the Old Assyrian archives of Kaneš, the latter relies mainly on the archives from Mari palace; very few texts from Šubat-

Enlil and Harradum are concerned with these aspects. There were several ways to get wool: by purchasing from merchants and nomads, via taxes collected in-kind on nomads' herds, by raiding on herds, or it was simply taken from the palace flocks.⁶⁴



Fig. 13.3. Seal imprint Ka 82, seal A on the envelope KTS 1, 45a.

3.1. Wool trade in the private sphere

The Old Assyrian archives, discovered in the houses of merchants in Kaneš lower city, document indirectly the textile production of Aššur in a domestic context.⁶⁵ All the women of the house, including girls of unknown age and female slaves, spun wool and wove woolen textiles as witnessed by the letters they sent to Anatolia. There is a lack of material evidence of spinning and weaving at Aššur, but a seal imprint on a loan contract envelope found at Kaneš shows a woman presenting to the god, sitting in front of her, a spindle with thread wound on it (Fig. 13.3). A scale and a set of weights (or banks) are represented on the back of the woman. This seal, carved in the Anatolian style was used by an Assyrian man and clearly reflects the role of women in the production of textiles.⁶⁶

The total production of a wealthy household amounted to some 25 textiles yearly, which would have included *kutānum*-textiles.⁶⁷ These textiles were either used to dress the household members or were exported to Anatolia. The women needed large amounts of wool that they could buy, as already noted, from the Suhûm nomads coming from the southwest to Aššur in order to pluck their sheep and sell their wool, or from the nomads from the Hamrim Mountains (see above). There is no information about centralized textile production in Aššur as attested later on, during the Middle Assyrian period.⁶⁸ There is also no mention of the purchase of large amounts of wool by local institutions as existed in the palace archives of Upper Mesopotamia and Syria. However, Aššur eponyms, as well as the House of the Eponym, owned textiles that they could sell or entrust to a merchant in a financial arrangement.⁶⁹ But, nothing is said about these textiles and they could have previously been bought by the institution to Babylonian merchants or to Aššur houses; eponyms, as well as the king and other Aššur institutions, participated in the long distance trade with Anatolia. The import of numerous Babylonian textiles supplemented local production to generate the thousands of textiles exported each year to Anatolia.⁷⁰

3.2. Wool trade in the institutional sphere

Palaces and estates could have had large stocks of wool in their storerooms which they needed for many purposes (see below). An inventory from Tell Leilān gives a detailed list of the wool and textile stocks.⁷¹ In addition the palace inventories of Mari list goods such as textiles, wool, oil, salt, and metal vessels that were kept in sealed containers (made of wood, reed or clay) or leather bags.⁷² Estates belonging to high officials also kept large quantities of wool as we learn from their house

inventories; the goods of Bannum and Zakura-Abum in Qaṭṭunān included numerous personnel, sesame, grain, beans and 1 talent of wool.⁷³

Wool was purchased to local merchants or to merchants from other areas. A text from Harradum mentions the sale for silver of $x + 1$ talent and 30 minas of wool to the palace, as well as 12 fleeces; the seller might have been Riš-Šamaš since he kept the document in his archives.⁷⁴ However, the great majority of the documentation comes from the archives of palaces which initiated the wool purchases. A text discovered at Tell Leilān shows the palace delivering silver to buy wool: 13 $\frac{5}{6}$ minas of the 14 $\frac{5}{6}$ minas of silver used to buy wool and barley to come directly from the king's safe, $\frac{2}{3}$ minas of silver were spent to buy 10 talents of wool from the merchants from the *kārum* of Šuna and the same amount was bought from the merchants from the *kārum* of Amursakku (in all 600kg of wool).⁷⁵ The examples from Mari are more numerous and more varied.⁷⁶ Mari palace would buy wool, goat hair or sheep to pluck from local merchants,⁷⁷ but also from merchants from the Suhûm,⁷⁸ or from Babylon. Mari palace steward, Mukannišum, required the authorization to use good quality wool from Babylon stored in a bag under the king's seal in order to finish a ceremonial costume for the king. In an impatient answer, Zimri-Lîm explained that he does not want to depend on Babylon's wool for his own wardrobe, and insisted on the fact that this costume should be made with wool produced by the palace's flock:⁷⁹ "How come you depend on wool from Babylon, and you make these demands of me? Before, in the time of Yahdun-Lîm, Šamši-Adad and Yasmah-Addu, well, did they consider wool from Babylon? (...) Isn't there enough wool from the plucking of the palace (sheep to provide) all the wool needed to weave this garment? So now, you should not consider wool from Babylon!" Wool was also bought from merchants from Emar, sometimes at a quite low price.⁸⁰

Silver was also sent to district governors with specific orders from the king concerning the price to be paid for wool; the fixed price could be so low that it was difficult to make the purchase as Lâ'ûm explains to the king: "My Lord wrote to me as follows: 'Concerning wool, matter of your letter, the governors received instructions (...) Buy some (wool) for an amount of 3 $\frac{1}{3}$ minas of your silver at the rate of 40 minas each (shekel of silver).' (...) *I started to buy any wool from the merchant and I gave silver to the merchant, but it is with a lot of difficulties that for 3 $\frac{1}{3}$ minas (...)*".⁸¹

3.3. Wool from the palace flocks

The wool purchased by the palace complemented its own production. Indeed, palaces and estates owned large herds of sheep which produced important amounts of wool. These animals were transferred to high officials in charge of the livestock. A Tell Leilān administrative text registers 127 sheep and goats of Hammu-Epuh of Amaz entrusted to Zimri-Hammu at Šehna.⁸² Documents from Tell Rimah concern sheep given to shepherds.⁸³

Many administrative tablets refer to the plucking of sheep belonging to Mari palace and the transfer of their wool to palace officials and textile specialists in the account house.⁸⁴ The palace usually had large stocks of wool of various qualities, but it could also be out of stock as we learn from Mukannišum's letter quoted above in which he asks to open bales containing Babylonian wool.⁸⁵

Flocks were also owned by the high official of Mari⁸⁶ or attached to governors'

estates in Terqa, Qaṭṭunān and Saggarātum. The wool produced by these animals was collected to be given to weavers locally, to be transported into another district or sent to Mari.⁸⁷ After the death of Terqa's governor, Sammêtar, his houses were inspected both in Terqa and Mari, and the wool plucked from his sheep was transferred to three weavers of Terqa's palace.⁸⁸

3.4. Wool paid as a tax

Mari palace also received animals and their products as the payment of taxes. The *sugāgūtum* tax was paid in several installments by the administrative head of local centres, who was a kind of sheikh called *sugāgum*, as his nomination was confirmed by the king; it was paid in silver, gold, animals (oxen, cows, donkeys, sheep), wool and textiles.⁸⁹ Thus, the *sugāgūtum* was sometimes paid in sheep which were plucked on their arrival in the palace. This assumes that the arrival of the sheep at the palace coincided with moulting: "30 minas of second quality wool from sheep representing the *sugāgūtum* tax of Ibal-pi-El, *sugāgum* of Šakidan, which have been plucked in the date palm tree court, handed on to Mukannišum".⁹⁰ When a *sugāgum* disappeared before paying the total amount of his *sugāgūtum* tax, the remainder was added to the *sugāgūtum* of his successor, chosen by the authority, as we learn from a letter sent by Yasmah-Addu to his father: "Previously, Yatarum was *sugāgum* of Ya'il, but he died. Today, 5 men chosen among the notables of Ya'il and x men belonging to the nomads came to me (...) I named Yarkab-Addu as *sugāgum* of Ya'il instead of Yatarum. He shall bring [x] minas of silver and 500 sheep, and I will receive from him [x] minas of silver and [x] hundreds of sheep which correspond to Yatarum's overdue payment".⁹¹ This overdue payment could be paid in wool.⁹² The silver from the *sugāgūtum* tax could also be used to buy wool.⁹³

Other taxes could result in the delivery of animals or wool to the palace. The *miksum* tax was a commercial tax paid on transactions.⁹⁴ The *igisum* tax was paid by notables who contributed to sacrifices ordered by the king for Ištar's festival: the wool of the sheep or the hair of the goats could be collected before the ceremony.⁹⁵

The status of the *šūrubtum* is not completely clear, translated as 'contribution', it is both considered as a periodic fee imposed on provinces⁹⁶ and an allegiance 'gift'.⁹⁷ It often consisted of textiles, but could also be given in goat hair or wool of various qualities: "14 minas of first quality wool and 1 talent 40 minas of second quality wool represent the *šūrubtum* of Gabûm (from Humsân), given to Māšum".⁹⁸

It is almost impossible to know the percentages of the wool coming from the palace flocks, of the wool originating from taxes and the amount of wool purchased by the palace.

3.5. Acquisition of sheep and wool by raiding

In time of war, there was regularly plundering of humans, animals and goods. The females deported to Mari, with the exception of musicians, were mainly assigned to work with wool.⁹⁹ Flocks of sheep were also the object of looting by enemies who could easily take the animals away as Šamši-Adad explained to his son Yasmah-Addu concerning the herds of Ešnunna: "They will go down to the banks of the Euphrates, and at the moment they will let their sheep drink in the pens, this very day they will be subjected to a raid".¹⁰⁰ According to Tell Leilan letters, the plundering of sheep was done by mercenaries (*habbātum*); in case of threat,

herds had to be moved quickly.¹⁰¹

Less often, wool was taken as booty; an administrative document records leather bags containing textiles, wool, and nets originating from the booty of Admatum, given to Šamaš-tappe.¹⁰²

4. Qualities and prices of wool

The Old Assyrian documentation quotes a few qualities of wool: good (*dammuqum*) or extra good (*dammuqum watrum*), but also long (*arkum*), soft (*narbum*) or thick (*šapium*) wool. Colour is occasionally mentioned, denoting either natural or dyed wool: red (*sānum*), white (*pašium*), red-dyed (*makrûm*) or simply dyed (*šinîtum*).¹⁰³ But these descriptions mainly concern wool traded in Anatolia. Texts from Kaneš do not give the price of the wool in Aššur. But a royal inscription of Šamši-Adad I gives a list of basic commodities and the quantities that one could buy for one shekel of silver: “When I built the temple for the god Enlil, my lord, the prices in my city, Aššur, (were the following): 2 gur of barley could be purchased for 1 shekel of silver; 15 minas of wool for 1 shekel of silver; 2 bán of oil for 1 shekel of silver, according to the prices of my city Aššur”.¹⁰⁴ The 15 minas of wool obtained for a shekel of silver would correspond to the plucking of 7 or 8 sheep (with an average of 2 minas per sheep).

For Mari, J.-M. Durand distinguishes between four main qualities attested as a sequence in some texts:¹⁰⁵ *sîg sag* ‘first quality wool’, *sîg nisqum* ‘top quality wool’, *sîg ús* ‘second quality wool’, *sîg gurnu* ‘coarse wool’.¹⁰⁶ To these, one may add the *tuhšûm* wool which received a specific unknown treatment and was used to make precious garments, tents or for furnishing.¹⁰⁷ The quality of wool could also depend on the part of the sheep plucked or on its diet. Few texts refer to wool from fattened sheep.¹⁰⁸ The colours of wool are very rarely noted at Mari because it seems that the dyeing process took place mainly after weaving.¹⁰⁹

The range of prices for wool given by the written documentation of Upper Mesopotamia and Syria is quite large and naturally depended on its quality which was usually not specified. The lowest price mentioned, 40 minas of wool per shekel of silver, was quite unrealistic and was suggested by the king of Mari to his governors.¹¹⁰ Therefore, the actual lowest price of wool attested in the Mari texts concerned a purchase from a merchant from Emar of 50 talents for a price of 2 minas of silver (25 minas per shekel of silver, 25m:1s).¹¹¹ A text gives a rate of 20 minas of wool for one shekel of silver,¹¹² while several prices range around 17 minas of wool per shekel of silver.¹¹³ The price given in Šamši-Adad’s inscription corresponds to the price of common wool at Mari (15m:1s);¹¹⁴ it is also the price paid by Tell Leilān’s palace to merchants from nearby *kārums*.¹¹⁵ The *tuhšûm*-wool is much more expensive and could amount to one mina of wool per shekel of silver.¹¹⁶ Goat hair was much cheaper than wool; one could buy 30 minas of this product for one shekel of silver.¹¹⁷

Mari prices of common wool are much lower than those given by a text from Harradum discovered in the house of the merchant Rîš-Šamaš in which 5 minas of wool were bought for 1 shekel of silver.¹¹⁸ The price paid in Harradum is similar to the prices of various qualities of wool in the Larsa kingdom during the early Old Babylonian period: a talent of choice wool costs 10 ½ shekels of silver (thus 1 shekel of silver bought about 5 ⅔ minas of wool), new wool plucked from the flanks of the sheep cost 9 ½ shekels of silver, and ordinary wool, 8 ½ shekels of

silver.¹¹⁹

It is also similar to the rates usually found in the Kültepe texts dealing with the wool trade inside Anatolia – between 2 and 10 minas of wool per shekel of silver, the average price being about 6m:1s –¹²⁰ or in the Ešnunna laws (6m:1s).¹²¹ However, in Anatolia, the standard of value of silver had less buying power than in Mesopotamia.¹²²

5. Management of wool and textiles: the wool office at Mari

The wool bought by Aššur women was used to weave textiles in order to make garments for family members and servants. But their production exceeded the needs of their households, so they exported dozen of textiles to Anatolia thus contributing to the international trade. They were paid in return with silver.¹²³

Mari royal archives document the importance of wool in the palace economy which was organized through the wool office. The administrative and economic activities of the Middle Bronze Age palaces and estates were organized in economic departments or offices depending on the products or materials they were dealing with. For example, we know much about the beer office at Chagar Bazar,¹²⁴ the wine office¹²⁵ and the meat office at Mari.¹²⁶ These specialized departments were under the control of officials who supervised the supply in raw materials, controlled the stocks and organized the distribution to specialized workers. They could themselves be under the control of high palace officials. For example, under the reign of Yasmah-Addu, Ušur-awassu was in charge of the management of raw materials and of finished products; he had for example to manage the distribution of wool rations to servants.¹²⁷

In general, textile manufacture was well developed in ancient Mesopotamia. In view of the numerous Mari texts dealing with wool and textiles assembled by Durand 2009, one can easily conclude that a large number of them originated from the wool office; this observation is especially true for the first half of Zimrī-Līm's reign for which there is a concentration of documents.

In the palace, various wool purchases were registered in many small administrative documents. They usually mention the amount of silver allocated to purchase wool, and the name of the person in charge of the transaction, either a palace official or a palace craftsman,¹²⁸ but the quantity of wool purchased is not always recorded.¹²⁹ Some texts are particularly detailed: "1 mina 12 shekels of silver for the purchase of 23 talents 54 minas of wool at the rate of 20 minas (of wool) each (shekel of silver); bought from Yatar-El and Yašim-hammū, the men of Suhūm; in the *dintum*-farm of Zippatān (where) the plucking (took place); added to Mukannišum's stock, I will (thus) have to give back [6 shekels], via Mukannišum and Mannum-ša-kima-abi".¹³⁰ Indeed, many of these small administrative accounts mention Mukannišum, the palace steward, as recipient of wool or of silver to buy wool: "1 mina [x] shekels of silver for the purchase of 20 talents of wool bought to Meptūm by the intermediary of Ulluri; the wool must be deposited into Mukannišum department".¹³¹ All these operations were tightly controlled, all the expenses being recorded. Sometimes, even the source of the silver used for the purchase of wool was registered: "2 ½ minas 2 shekels of silver, the cost of the redemption of 13 men (and) 6 women, for the purchase of 38 talents of second quality wool, at the rate of 15 minas (of wool) each (shekel of silver), for the wool rations of male and female weavers".¹³² The silver linked to

the redemption of personnel was thus centralized by Mukannišum and later allocated to the purchase of wool, alum and tin.¹³³ Mukannišum had to give public accounts of these operations: “tablets concerning the silver with which wool, copper and tin were purchased from several sources by Mukannišum. He announced the amounts of silver used for his expenses, for the allocation of wool, copper and tin from his office, these tablets were written at the time of presentation of accounts, in the corridor of the date palm court, in the presence of the king”.¹³⁴

Several palace officials were involved in the wool office, delivering and receiving quantities of wool: Hamatil (under the reign of Sumū-Yamam),¹³⁵ Halimatum (Zimri-Lîm)¹³⁶ and Hissali (Zimri-Lîm).¹³⁷ The destination of the wool was also carefully registered. Among the recipients of wool, we find Yar’ip-El, Ahu-waqar and Idin-Mamma, known as textile specialists,¹³⁸ weavers and textile workshops.¹³⁹

Such an organization is also visible in private estates. In room XV of the house of Asqudum, royal diviner of Mari, were preserved several baskets with tablets. Clay *bullae* indicating their content were fixed onto the baskets, and one bears the following text: “tablets of wool and textiles received by [PN]”.¹⁴⁰ According to these tablets dated to the first years of Zimri-Lîm’s reign, 9 talents 3 minas of wool were stored in a sealed room.¹⁴¹ This wool came from various sources, mainly Asqudum’s flock and purchases. Thus, 3 talents 19 minas were brought by Mannum-balum-ilî from Humzan, and 5 talents were bought by two people in Dûr-Yahdun-Lîm.¹⁴² It was then distributed to Yakun-bahli, Yamama, and Inibsina, heads of three female weaver teams who had to produce textiles of specific weights, the total corresponding to the distributed wool.¹⁴³

Although they are less visible, we can speculate that the production of textiles by the institutions of the other capitals of Upper Mesopotamia and Syria might have worked according to the same scheme. Some letters sent to Iltani by her husband Aqba-hammu, king of Karana, or by an official also deal with the organization of textile production. Wool was sent by these two persons to a textile workshop supervised by Iltani, and in return she was required to send some textiles to her husband.

6. Uses of wool

Wool bought by the Assyrian women was woven into textiles to clothe family members and servants or to be sold abroad. The destination of wool in palaces and estates was much more varied and its circulation was embedded in the palace economy.

6.1. *Garments for the palace population and dependents*

Huge quantities of wool were distributed via the wool office, to the textile manufacturers where dozens of men and women worked, mainly slaves. The weavers had to give back, as finished products, various pieces of textiles and clothes of more or less fine quality, for which number and weight would be specified. Administrative texts detailed the amount of wool transferred, the recipient of the wool, usually an official heading teams of weavers, its destination (clothes, carpets, tents, etc.), and the date of the transaction: “7 minas $\frac{2}{3}$ of second quality wool received by Išhi-Erah; 10 minas of second quality wool received by

Iskatan, 8 minas of second quality wool for coats received by Abi-Šamaš. (Date)".¹⁴⁴ The remaining wool which had not been used was also accounted for and could be allocated for another task.¹⁴⁵ The numerous clothes thus made were then distributed to the palace residents (king's family, women, children), to high officials, or to soldiers: for example, the king had to send 2 000 garments to the army because weather was cold.¹⁴⁶

The king's clothes received special attention and were made directly under the orders of Mukannišum as we learn in a letter that he received from the king:¹⁴⁷ "I gave you some instructions concerning the cloth with the applications to be made (...) Give strict orders to the male and female textile workers. This cloth must be done as if it was a cloth from Tuttub, carefully woven and knotted from warp and weft and its inside should look like a sheet of silver. This cloth will have a hem made in the Yamhad fashion and as for a *huššum* textile, a *širpum* (-dyed?) will be added to it. One should be careful that the warp and weft are tightly packed because if the ornaments are too heavy then they will be 'stringed' so that the cloth tears. One must be very careful making this cloth because it will be seen by all the people".

6.2. Garments as gifts

Fine quality clothes or complete suits of clothing were offered by Mari kings to their allies as diplomatic gifts.¹⁴⁸ In return, the king also received fine garments.¹⁴⁹ Many administrative documents register such gifts, both given and received, which also included objects in precious metals: these exchanges of prestigious goods had an extra-economic character with a political and symbolic meaning.¹⁵⁰ Garments were also offered to messengers and ambassadors visiting the king; but messengers often had to give their king part of the gifts received.¹⁵¹

According to the Tell Rimah archives, the textile workshop supervised by Iltani produced textiles that her husband Aqba-hammu could use as diplomatic gifts: "Now send me quickly any cloth that you have available, whether of first or second quality for presents (for the king of Širwun)".¹⁵²

6.3. Wool rations (*síg-ba*)

When not turned into textiles, wool was distributed as a ration.¹⁵³ The residents of the palace, who were predominantly female, received rations in wool and oil; there was no distribution of grain rations, because these people were directly fed by the palace kitchen.¹⁵⁴ Wool was distributed at the end or the beginning of a month, but we do not know for which period. Named women of very high rank would receive a 8 to 20 minas (4–10 kg) wool ration, while servants got between 4 to 7 minas (2–3.5 kg).¹⁵⁵ The main recipients were the wives of the king and women members of his family, then big and small musicians. Under Yasmah-Addu, some female musicians in the office of Rišiya made demands to get more wool.¹⁵⁶ At the time of Yahdun-Lîm, according to a small unpublished account, 32 talents (960 kg) of wool constituted the rations (*síg-ba*) of the Šuprum palace residents.¹⁵⁷ This may be compared with the 36 talents of wool (more than one ton) received by the women of the Mari palace under Zimrî-Lîm's reign; it consisted of rations of mainly 4 to 8 minas each.¹⁵⁸ The amount of wool distributed each year must have been enormous.

Indeed, the distribution of rations concerned not only the palace population but also dependents working for the palace. In exchange for their services, workers

received rations (*piqittum*) in grain, oil and wool. Thus, all the palace employees received such wool rations. Among these were textile specialists – male and female weavers,¹⁵⁹ male and female cooks,¹⁶⁰ brewers,¹⁶¹ stablemen,¹⁶² sedan-chair carriers¹⁶³, but also ploughmen,¹⁶⁴ shepherds and cowherds,¹⁶⁵ and other workers.¹⁶⁶ These distributions also involved the military. In a letter sent to his son, Šamši-Adad insisted on the fact that, instead of spending silver, he should provide ‘flour, wool and oil’ for the soldiers who came to protect Mari.¹⁶⁷ Wool rations were also given to members of the religious sphere according to an administrative text dated to the reign of Yasmah-Addu which records an allocation of 30 minas of second quality wool given to the great priestess of Dagan.¹⁶⁸

Wool rations are also attested elsewhere. At Tell Leilān, for example, an official is sent to the king because he did not give enough wool rations to his men: “We do not receive grain allocations, nor are we given wool allocations, and winter has arrived!”¹⁶⁹

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According to the written documentation of the first centuries of the 2nd millennium BC, palaces and estates of Upper Mesopotamia and Syria would have had very important needs for wool: it was used mainly to clothe the royal family and palace residents, to distribute as allocations to workers dependent on the palace, or to weave prestigious garments offered to foreign kings. Mari textile manufacture was well developed and extremely active; it had a large, mainly female servile workforce, and its substantial textile production was almost exclusively for internal consumption and for diplomatic gifts. There is no attestation of palace textile products which would have been regularly exported and sold. The wool produced by the palace flocks did not suffice for its needs; wool was also acquired via taxes, purchases and even raids. The palace spent great amounts of silver to buy large quantities of wool; the sources of the silver used for these purchases were quite varied. Such a constant need for wool could explain why, in the institutional documentation, apart from the wool distributed as allocations to palace dependents, this material does not seem to have been used much as a primitive currency to buy other goods. The woollen textiles, produced by the wool office as gifts to visitors and foreign courts, were interlinked with social and political relationships.

Other smaller archives of Upper Mesopotamia and Syria, such as those from Tell al-Rimah and Tell Leilān, to a lesser extent, document the same kind of organization for the management of sheep flocks, the collection of wool and production of textiles.

Relatively speaking, the need for wool by the women of Aššur, for internal consumption and for the exports to Anatolia, was also substantial. There, it is possible to follow the complete economic cycle of the wool that was intrinsic to the Old Assyrian long distance trade in Anatolia. To buy wool on the Aššur market, Assyrian women used the silver, which was the proceeds of their sales of textiles sold in Anatolia. There, wool could be exchanged with copper or silver, thus being used also as a means of payment.¹⁷⁰ The profitable Assyrian woollen textile trade to the West went on during the Middle Assyrian period as is attested by a few texts from Late Bronze Age Aššur.¹⁷¹ Wool and thread had also a symbolic dimension; as suggested by the Old Anatolian style seal imprint, and they could be used as

offerings.

Abbreviations

- AK Ankara Kültepe Tabletleri = Ankaraner Kültepe Texte. Ankara, 1990ff.
- AR Archives Royales de Mari, Traductions. Paris, 1950ff.
- BE The Babylonian Expedition of the University of Pennsylvania, Series A: Cuneiform Texts. Philadelphia, 1893ff.
- BI Babylonian Inscriptions in the Collection of James B. Nies, Yale University. New Haven, 1917ff.
- CC Cuneiform Texts from Cappadocian Tablets in the British Museum. London, 1921–1975.
- FM Florilegium marianum (Mémoires de NABU). Paris, 1991ff.
- KS Sigillographic tablets from Kültepe (Kt), *kārum* Kaneš (/k), found from 1948(=a) until 1972(=z).
- kt Zimri-Lim tablets found in *kārum* Kaneš since 1973.
- KT Keilschrifttexte in den Antiken-Museen zu Stambul. Die altassyrischen Texte vom Kültepe bei Kaisarije. Constantinople/Istanbul 1926ff.
- LA Océanographies Anciennes du Proche-Orient. Paris, 1965ff.
- 16–18 See Durand 1997–1998, 2000.
- 19 See Michel 2001.
- MARI Mari. Annales de recherches interdisciplinaires. Paris, 1982ff.
- MS Materialien zum sumerischen Lexicon. Roma 1937ff.
- OT Dalley, C. B. F. Walker and J. D. Hawkins, *The Old Babylonian Texts from Tell al Rimah*, London, 1976.
- OI Oriental Institute Publications. Chicago, 1924ff.
- Pr Sigillographic texts in K. Hecker, G. Kryszat and L. Matouš, *Kappadokische Keilschrifttafelnaus den Sammlungen der Karlsuniversität Prag*. Praha 1998.
- TC Tablettes Cappadociennes (Textes Cunéiformes du Louvre/TCL), Paris.
- TPA Michel and P. Garelli, *Tablettes paléo-assyriennes de Kültepe 1*. Istanbul, 1997.
- VS Vorderasiatische Schriftdenkmäler der Staatlichen Museen zu Berlin. Berlin, 1971ff.
- ZL Zimri-Lim, king of Mari (years of reign)

Bibliography

- Andrae, W. (1938) *Das wiedererstandene Assur*. Leipzig.
- Bardet, G. (1984) Un aspect du travail de la laine à Mari (Nos 1–7). ARMT 23, 5–15. Paris
- Breniquet, C. (2013) Functions and Uses of Textiles in the Ancient Near East. Summary and Perspectives. In M.-L. Nosch, H. Koefoed and E. Andersson Strand (eds), *Textile Production and Consumption in the Ancient Near East*, 1–25. Ancient Textiles Series 12. Oxford.
- Cassin, E. (1959) Le bain des brebis. *Orientalia* 28, 225–229.
- Chambon, G. (2009) *Les archives du vin à Mari*. FM 11, Paris.
- Charpin, D. (1985) Les archives du devin Asqudum dans la résidence du ‘chantier A’. MARI 4, 453–462, Paris.
- Charpin, D. (1996) Maisons et maisonnées en Babylonie Ancienne de Sippar à Ur. Remarques sur les grandes demeures des notables paléo-babyloniens. In K. R. Veenhof (ed.), *Houses and Households in Ancient Mesopotamia. Papers read at the 40th Rencontre Assyriologique Internationale, Leiden, July 5–8, 1993*, 221–228. Publications de l’Institut historique et archéologique néerlandais de Stamboul 78. Leiden.
- Charpin, D. and Durand, J.-M. (1997), Aššur avant l’Assyrie. MARI 8, 367–392. Paris.
- Dalley, S. (1977) Old Babylonian Trade in Textiles at Tell al Rimah. *Iraq* 77, 155–159.
- Dalley, S. (1980) Old Babylonian Dowries. *Iraq* 42, 53–74.
- Dercksen, J. G. (2004) *Old Assyrian Institutions*. Publications de l’Institut historique et archéologique néerlandais de Stamboul 98. Leiden.
- Durand, J.-M. (1983) *Textes administratifs des salles 134 et 160 du palais de Mari*. ARMT 21. Paris.
- Durand, J.-M. (1985) Les dames du palais de Mari à l’époque du royaume de Haute-Mésopotamie. MARI 4, 385–436. Paris
- Durand, J.-M. (1986) Villes fantômes de Syrie et autres lieux. MARI 5, 199–234. Paris.

- Durand, J.-M. (1990), La cité-État d'Imar à l'époque des rois de Mari. *MARI* 6, 39–92. Paris.
- Durand, J.-M. (1992) Unité et diversité au Proche-Orient à l'époque amorrite. In D. Charpin and F. Joannès (eds.), *La circulation des biens, des personnes et des idées dans le Proche-Orient ancien. Actes de la XXXVIII Rencontre Assyriologique Internationale* (Paris, 8–10 juillet 1991), 97–128. Paris.
- Durand, J.-M. (1994) Administrateurs de Qaṭṭunân. In D. Charpin and J.-M. Durand (eds), *Recueil d'études à la mémoire de Maurice Birot*, 83–114. FM 2, Paris.
- Durand, J.-M. (1997) *Documents épistolaires du palais de Mari I* (LAPO 16), Paris.
- Durand, J.-M. (1998) *Documents épistolaires du palais de Mari II* (LAPO 17), Paris.
- Durand, J.-M. (2000) *Documents épistolaires du palais de Mari III* (LAPO 18), Paris.
- Durand, J.-M. (2009) *La nomenclature des habits et des textiles dans les textes de Mari*. Matériaux pour le Dictionnaire de Babylonien de Paris, 1; ARMT 30. Paris.
- Eidem, J. (2008) Old Assyrian Trade in Northern Syria. The Evidence from Tell Leilan. In J. G. Dercksen (ed.), *Anatolia and the Jazira during the Old Assyrian Period*, 31–41. Publications de l'Institut historique et archéologique néerlandais de Stamboul 111. Leiden.
- Eidem, J. (2011) *The Royal Archives form Tell Leilan. Old Babylonian Letters and Treaties from the Lower Town Palace East*. Publications de l'Institut historique et archéologique néerlandais de Stamboul 117, Leyden.
- Garelli, P. (1965), Tablettes cappadociennes de collections diverses (suite). *Revue d'Assyriologie* 59, 19–48, 149–176.
- Grayson, A. K. (1987) *Assyrian Rulers of the Third and Second Millennia BC (to 1115 BC)*. The Royal Inscriptions of Mesopotamia Assyrian Periods 1, Toronto.
- Günbattu, C. (1987) Ankara Anadolu Medeniyetleri Müzesi'nde Bulunan Üç Tablet. *Cumhuriyetin* 60. *Yıldönümü armaanı*, 189–199. Ankara.
- Horowitz, W. and Oshima, T. (2006) *Cuneiform in Canaan. Cuneiform Sources from the Land of Israel in Ancient Times*. Jerusalem.
- Horowitz, W. and Wasserman, N. (2004) From Hazor to Mari and Ekallātum: A Recently Discovered Old Babylonian Letter from Hazor. *Amurru* 3, 335–344. Paris.
- Ismail, F. (1991) *Altbabylonische Wirtschaftsurkunden aus Tall Leilan (Syrien)*, Unpublished PhD, Eberhard-Karls-Universität Tübingen.
- Joannès, F. (2006) *Harradum II. Les textes de la période paléo-babylonienne (Samsu-iluna – Ammisaduqa)*. Paris.
- Kupper, J.-R. (1982a) Les prix à Mari. *Orientalia Lovaniensia Analecta* 13, 115–121.
- Kupper, J.-R. (1982b) L'usage de l'argent à Mari. *Zikir šumim, Studies Presented to F. R. Kraus*, 1982, 163–172.
- Kupper, J.-R. (1990) La vie économique à Mari. In E. Aerts and H. Klengel (eds), *The Town as Regional Economic Centre in the Ancient Near East*, 37–44. Leuven.
- Kupper, J.-R. (1991) Le commerce à Mari. *Bulletin de la Classe des Lettres et des Sciences Morales et politiques*, Académie Royale de Belgique, 41–57. Bruxelles.
- Lacambre, D. 2008 '10. Le bureau de la bière'. In Ö. Tunca and A. el-M. Baghdo (eds), *Chagar Bazar (Syrie) III. Les trouvailles épigraphiques et sigillographiques du chantier I (2000–2002)*, 180–207. Louvain, Paris, Dudley.
- Lambert, W. (1960) Le bain des brebis. *Revue d'Assyriologie* 54, 88.
- Lassen, A. (2010) The Trade in Wool in Old Assyrian Anatolia. *Jaarbericht van het Vooraziatisch-Egyptisch Genootschap Ex Oriente Lux* 42, 159–179.
- Lerouxel, F. (2002) Les échanges de présents entre souverains amorrites au XVIII^e siècle av. n. è. D'après les archives royales de Mari. *FM* 6, 413–463. Paris.
- Lion, B., Michel, C. and Noel, P. (2000) Les crevettes dans la documentation du Proche-Orient ancien. *Journal of Cuneiform Studies* 52, 55–60.
- Lumb, D. R. A (2013) Textiles, Value, and the Early Economies of North Syria and Anatolia. In M.-L. Nösch, H. Koefoed and E. Andersson Strand (eds), *Textile Production and Consumption in the Ancient Near East*, 54–77. Ancient Textiles Series 12. Oxford.
- Marti, L. (2008) *Nomades et sédentaires à Mari. La perception de la taxe-sugâgûm*. FM 10, Paris.
- McCorriston, J. (1997) The Fiber Revolution. Textile Extensification, Alienation, and Social Stratification in Ancient Mesopotamia. *Current Anthropology* 38, 517–549.
- Michel, C. (1998) Les mites d'Assyrie: Moths in the Assyrian Texts of the Second Millennium BC. *Journal of the American Oriental Society* 118, 325–331.

- Michel, C. (2001) *Correspondance des marchands de Kaniš au début du IIe millénaire avant J.-C.* LAPO 19. Paris.
- Michel, C. (2003) *Old Assyrian Bibliography*. Old Assyrian Archives Studies 1. Leiden.
- Michel, C. (2006a) Old Assyrian Bibliography 1 (Febr. 2003-July 2006). *Archiv für Orientforschung* 51, 435–449.
- Michel, C. (2006b) Femmes et production textile à Aššur au début du IIe millénaire avant J.-C. *Techniques et culture* 46, 281–297.
- Michel, C. (2006c) Qaṭarā. In M. Streck (ed.), *Reallexikon der Assyriologie* 11, 154–156. Berlin.
- Michel, C. (2011) Old Assyrian Bibliography 2 (August 2006-April 2009). *Archiv für Orientforschung* 52, 416–437.
- Michel, C. (2012) Šubartum. In M. Streck (ed.), *Reallexikon der Assyriologie* 13, 225–227. Berlin.
- Michel, C. (in preparation) *Women from Aššur and Kaniš*. Writings from the Ancient World, SBL, Baltimore
- Michel, C. and Veenhof, K. R. (2010) The Textiles Traded by the Assyrians in Anatolia (19th-18th centuries BC). In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 210–271. Ancient Textiles Series 8. Oxford.
- Owen, D. (2012) Three Early Old Babylonian Accounts. In T. Boiy, J. Bretschneider, A. Goddeeris, H. Hameeuw, G. Jans and J. Tavernier (eds), *The Ancient Near East, A Life! Festschrift Karel Van Lerberghe*, 445–456. Orientalia Lovaniensia Analecta 220, Leuven.
- Ozan, G. (1994) Viandes et poissons: transport et conservation (textes no. 83 à no. 85). In D. Charpin and J.-M. Durand (eds), *Recueil d'études à la mémoire de Maurice Birot*. FM 2, 151–157. Paris.
- Roth, M. (1997) *Law Collections from Mesopotamia and Asia Minor*. Atlanta.
- Rouault, O. (1977) L'approvisionnement et la circulation de la laine à Mari. D'après une nouvelle lettre du roi à Mukannišum. *Iraq* 77, 147–153.
- Thomason, A. K. (2013) Her Share of the Profits: Women, Agency, and Textile Production at Kültepe/Kanesh in the Early Second Millennium BC. In M.-L. Nosch, H. Koefoed and E. Andersson Strand (eds), *Textile Production and Consumption in the Ancient Near East. Archaeology, Epigraphy, Iconography*. 93–112. Ancient Textiles Series 12, Oxford.
- Van Koppen, F. (2002) Seized by Royal Order. The Households of Sammêtar and Other Magnates at Mari. FM 6, 289–372. Paris.
- Veenhof, K.R. (1972) *Aspects of Old Assyrian Trade and its Terminology*. Studia et Documenta 10. Leiden.
- Veenhof, K.R. (1977) Some Social Effects of the Old Assyrian Trade. *Iraq* 39, 109–118.
- Veenhof, K.R. (2003) Trade and Politics in Ancient Aššur. Balancing of Public, Colonial and Entrepreneurial Interests. In C. Zaccagnini (ed.), *Trade and Politics in the Ancient World*. Saggi di Storia Antica 21, 69–118. Roma.
- Vincente, C.A. (1991) *The 1987 Tell Lei/an Tablets Dated by the Limmu of Habil-kinu*. Unpublished Ph.D. dissertation, Yale University, New Haven.
- Waetzoldt, H. (1972) *Untersuchungen zur neusumerischen Textilindustrie*. Roma.
- Ziegler, N. (1999), *Le Harem de Zimrî-Lîm*. FM 4. Paris.

1 These employed the overwhelming majority of enslaved women and children. McCorriston 1997 (comments after the paper by M. Liverani), 537. Men were often involved in large textile workshops as specialists in some techniques, or as heads of teams of workers, see for example the administrative texts of Mari recording the receipt of wool by heads of teams of weavers (see below). For a study on the economic role of textiles in the economies of Northern Syria and Anatolia during the Early Bronze Age, see Lumb 2013.

2 Erišum I A.O.33.2:20–25 (Grayson 1987, 22); see Veenhof 2003. Michel and Veenhof 2010 present all the data about textiles in the Old Assyrian documentation. For an inventory of the Old Assyrian texts, see Michel 2003; 2006a; 2011.

3 Durand 2009 gives a detailed study of textiles in the Mari texts.

4 Michel and Veenhof 2010, 218–226.

5 For example, Durand 2009 mentions that *nahlaptum-shirts* could be made according to the fashion of Elam (p. 69), Haššum (p. 69), Marhaši (p. 71) and Šubartum (p. 71); for Šubartum, see Michel 2012.

6 Michel 2006b, 290–293. The total number of textiles sent annually by each Aššur household;

amounted to dozens, each weighing about 5 minas (2.5 kg), see Veenhof 1972, 89–90 and below.

7 TC 2, 7:25–26 (LAPO 19, 108), “There is no Šurbum-wool available”, *ša-ap-tum, Šu-ur-bu-i-tum lá-šu*.

8 MSL 11, 58:164, see Dercksen 2004, 16, note 32, and Michel and Veenhof 2010, 221. For references to wool from this area, see for example the letter ‘Tablet Rendell’ (by courtesy of K. R. Veenhof) sent to Pušur-kēn by his wife Lamassi: 5–7, *a-šu-mi, túg ša Šu-ur-bu-i-a-tim, ša ta-áš-pu-ra-ni* (...) 14–18, *iš-tú, wa-ar-ki-ú-tim, túg ša Šu-ur-bu-i-a-tim, a-na li-ta-ab-šá-ká, ú-šé-lá-kum* “As for the textile (made of wool) from Šurbu about which you wrote me (...) I will send up to you by a later (caravan) the textile (made of wool) from Šurbu for you to wear”; this text is edited in Michel *in preparation*, No. 167. For textiles made of this type of wool, see TC 2, 14:6, 27 *túg sig₅ Šu-ur-bu-i-ú <ú> -tum* are bought in Aššur.

9 Charpin and Durand 1997, 377 and 387–391, No. 4 (A 2459):rev.3’-6’, *ú bu-qú-um Su-hi-im, an-na-nu-um li-ib-ba-qí-im-ma, ú lú-meš Aš-šu-ru-ú^{ki} li-il-li-ku-nim-ma, an-na-nu-um-ma sig li-il-qú-ú*.

10 Charpin and Durand 1997, No. 5 (A 4535-bis):rev. 2’-5’, *dumu-meš Aš-šu-ur^{ki} ú-[da-ab-bu-nim], um-ma-a-mi a-na mi-nim it-ti Zi-i[m-ri-Li-im sa-al-ma-ta], ú dam-gār-meš^{ru-ur} udu-há ú sí[g...], ta-ak-la i-na-an-naš-ta-ap-pa-ar [a-na li-ib-bi], ma-tim li-ir-du*, “Assyrians co[mplained] as follows: ‘Why have you [made an alliance] with Zi[mri-Lim] and have you detained our merchants, sheep and wo[ol...]? Now, write continually so that they lead (them) back inside the country!’”

11 For wool see M. 11281:1–9 (Durand 2009, 312, ZL 5), and for goat hair, see M. 11269:1–7 (Durand 2009, 294).

12 VS 26, 17:5–8, *a-šu-mi šá-im : túg ša A-ki-dí^t/e, ša ta-áš-pu-ra-ni, iš-tù : tù-uš-ú A-ki-dí^t-ú, a-na A-lim^{ki} ú-la e-ru-bu-/nim, ma-sú-nu : sá-hi-a-at-ma*.

13 ARMT 13, 10 (LAPO 16, 134). A bag contained 30 minas of such wool and any remainder had to be sealed in the bag again by the queen mother, ARMT 18, 20 (LAPO 16, 135). See also A. 1285 (Rouault 1977, LAPO 16, 136, see below, n. 79).

14 ARMT 26, 285: 12–14, *iš-tu kaskal k[á-dingir-ra]^{ki}, la i-la-ka sig-duš-ú-a i-na ma-a-tim an-[ni-tim], i-ta-aq-’ra-r[a]*, “Since caravans from Babylon do not arrive anymore, *tuhšum* wool became rare in this country”. This letter dates from Šamši-Adad’s time.

15 OBTR 134:33–36, *[a]-nu-um-ma zí-ki-ir šu-mi-ki, [x +]5 ma-na sig-babbar sag ša ú-pu-ur-ti-ki, ú 1 ^{gi}qú-up-pa-am ša buru₅ ab-[ba], uš-ta-bi-ta-ki-im*; see Lion, Michel and Noel 2000, 57, n. 12.

16 See Joannès 2006, Nos 5 and 62 for the sale of sheep; Joannès 2006, Nos 67 and 103 for the sale of wool; Joannès 2006, 27.

17 Durand 2009, 149–152.

18 Wool from Terqa is attested in the following texts dated to Zimri-Lim’s reign: FM 6, No. 41 (30 minas of ordinary quality and 1 talent of second quality wool transferred to Terqa); ARMT 7, 92 (1 talent of wool); M. 10379 (Durand 2009, 267, first quality wool); M. 15096 (Durand 2009, 317, ZL 6: 10 minas of first quality wool); ARMT 9, 35 (various quantities of wool plucked at Terqa). Wool from Qatṭunān is attested in the following texts dated to Zimri-Lim’s reign M. 11606 (Durand 2009, 478, 8 talents 17 minas of wool brought from Qatṭunān); M. 10376 (Durand 2009, 462, various qualities of wool from 300 sheep plucked at Qatṭunān).

19 ARMT 23, 583: receipt for 23 minas of first quality wool from the plucking of Sammētar’s sheep in the *bīt tertim* of Terqa’s palace, given to the weavers. This amount of wool corresponds to 11 or 12 sheep; see the comments on this text by van Koppen 2002, 309.

20 Joannès 2006, No. 70:23–27, *še-um i-na A-lim^{ki} la ba-a-ši, šum-ma [ta-n]a-ṭa-al iš-tu E-m[ar]^{ki} še-a-am, le-qé-a-am sig-há, le-qé-a-am*, “there is no more grain in the city. If you see that it is possible, take some grain for me from Emar; take also some wool”.

21 Durand 1990, 75.

22 M. 20211 (Durand 2009, 404, text previously known as Salle 143, 80, see Kupper 1982a, dated to ZL 12): it gives the lowest price attested for the purchase of wool to an inhabitant of Emar: 50 talents for 2 minas of silver (see below).

23 A.2500+ (LAPO 18, 926): the merchant of Emar, Habatān, complained that his merchandise – 30 minas of bronze, 30 minas of *tuhšum*-wool, 3 bronze spears, 60 belts and 10 donkeys – that he had previously bought had been stolen.

24 In OBTR 106, Iltani supplies wool for a woman named Azzu-ena in the town of Andarig, see Dalley 1977.

25 Kt 93/k 75:13–14, 1 *túg ni-ib-ra-ra-/am, ša Qá-ṭá-ra*; for the bibliography about the location of Qatṭarā, see Michel 2006c.

26 See Vincente 1991, No. 415: sheep and goats of Hammu-Epuh of Amaz have been entrusted to Zimri-Hammu at Šehna, a high official in charge of palace flocks. The palace is buying wool from merchants according to Ismail 1991, No. 103:14–18: $\frac{2}{3}$ *ma-na* kù-babbar *šá-im* 10 gú sig, *ša a-na ka-ar lú Šu-na-a^{ki} in-na-ad-nu*, $\frac{1}{3}$ *ma-na* kù-babbar 10 gú sig, *ša a-na ka-ar lú A-mur-sa-ak-ki^{ki}, in-na-ad-nu*, “ $\frac{2}{3}$ minas of silver, price of 10 talents of wool that have been given to the (merchants) of Šuna’s *kārum*, $\frac{1}{3}$ minas of

silver, price of 10 talents of wool that have been given to the (merchants) of Amursakku's *kārum*". See the comments on this text by Eidem 2008, 36.

27 BIN 6, 7 (LAPO 19, 305): 16–21, *i-nu-mi* : *ki-sà-am*, *tù-šé-ba-lá-ni*, *síg-hi-a šu-uk-nam*, *ša-áp-tù-um*, *i-na A-lim^{ki}*, *wa-aq-ra-at*. See also BIN 4, 9 (LAPO 19, 304); Garelli 1965, 158, No. 25:13–16 (LAPO 19, 306). 28 CCT 5, 41a mentions half a donkey-load containing silver and gold, as well as 5 belts and 3 minas of wool. See also AKT 1, 7.

29 Prag I 554: 9–10, 3 *ma-na* *síg-hi-a*, *a-na Wa-qúr-tim*.

30 Michel and Veenhof 2010, 216; Lassen 2010.

31 A specific quality of wool was named after the town of Hahhum in a late Old Assyrian text from Ališar, see Dercksen 2004, note 492.

32 Michel 2006b; Dercksen 2004, 273–274; Lassen 2010, 167–170.

33 See Dercksen 2004, 179, and the contribution of A. Lassen in this volume.

34 Durand 1992, 105, and ARM 5, 15 (LAPO 17, 722); Durand 1998, 470–471. A letter from Tell Leilan also mentions a sheep disease which might turn into epizootic; see Eidem 2011, No. 85.

35 Goat hair to make ropes (*eblum*): ARMT 22, 98 (Yahdun-Lim) and ARMT 22, 85 (ZL). M. 8880 (Durand 2009, 480) mentions the purchase of 4 minas of goat hair to make a *huruppatum*-tent.

36 M. 11269 (Durand 2009, 294) mentions the payment of 3 shekels of silver for the purchase of goat hair (*síg ùz*) from Buqâqum, the Suhean. A huge quantity of goat hair is attested in M. 6386 (Durand 2009, 427): 10 talents of wool and 40 talents of goat hair given to Mukannišum in the presence of the king. References to goat hair are quite scarce in our documentation, contrary to the Middle Assyrian one; see the contribution of N. Postgate in this volume.

37 ARM 5, 9 (LAPO 18, 915).

38 OBTR 153:8–12, *a-nu-um-ma* anše *a-na qa-at*, ¹*Ṭà-ab-^dA-šur*, *aṭ-ṭà-ar-da-am*, *síg ù ì-giš*, *i-na šu-ur-ki-bi-ma šu-bi-lim*. "Now, I have sent down a donkey by Ṭab-Aššur. On loading, send me wool and sesame oil".

39 Kt 87k 45 (by courtesy of K. Hecker), see comments by Dercksen 2004, 274.

40 ARMT 22, 321: wool is packed into *šahhû*-textiles and *gusānum* bags. M. 11965 (Durand 2009, 449): 1 talent 57 minas of wool available kept in leather bags (*gusānum* and *luppum*); M. 18159 (Durand 2009, 416): list of leather containers containing textiles and wool from the booty of Admatum. M. 11894 (Durand 2009, 518): wool of Amorite sheep amounting to 7 shekels and wool of sheep fattened with flour, kept in leather bags (*gusānum*).

41 ARMT 27, 37 was sent by Zakira-Hammu, governor of Qaṭṭunān, who announced to the king that he had the sheep of the palace plucked by the workers of the district and sent the wool on wagons to Saggarātum.

42 See Durand 1998, 670–676.

43 ARMT 5, 67 (LAPO 17, 852), and the interpretation of this text by Abrahami in this volume.

44 Cassin 1959 for Nuzi; Lambert 1960 for other sources.

45 A special comb could have been used sometimes for this operation, see Andersson Strand in this volume.

46 ARMT 13, 30 (LAPO 17, 853) shows 226 workers requisitioned to pluck the sheep; the work could also be done by foreigners leasing their services, and by the king's personal servants.

47 ARMT 5, 65 (LAPO 17, 852). According to E. Andersson Strand in this volume a person could pluck around ten small sheep per day. At Ur III, textile workers plucked about 38 sheep a day, Waetzoldt 1972, 14–17.

48 ARMT 2, 140 (LAPO 17, 854).

49 ARMT 5, 67 (LAPO 17, 852); Durand 1986, 216.

50 ARMT 2, 140 (LAPO 17, 854).

51 Ismail 1991, No. 103; Eidem 2008, 36. Depending on the time necessary to pluck 7 or 8 sheep: a half day or a day, it was not very well paid.

52 See for example, ARMT 9, 245 recording 229 male plucked sheep.

53 ARMT 9, 35:1–9, [1]5 *ma-na* *síg sag*, [1] *gú* *síg uš*, 6 *gú* 50 *ma-na* *síg gur-nu*, *šunigin* 8 *gú* 5 [ma]-*na* *síg-há*, *bu-qú-um* *uš-há*, *ša a-na* *e ku-nu-ki*, [š] *u-nu-ba*, *i-nu-ma bu-qú-m*[i]-*im*, *i-na Qa-aṭ-ṭu-na-an^{ki}* (xii ZL 12).

54 ARMT 23, 373, xii ZL 6.

55 ARMT 5, 67 (LAPO 17, 852): wool delivered to the *lú-túg* (textile specialists) and to the *išparātum* (female weavers).

56 M. 6032 (Durand 2009, 265): 22 ⅔ minas of raw wool just plucked delivered to Yar'ip-El; ARMT 22, 93: receipt of raw wool corresponding to the plucking of 40 sheep; ARMT 23, 94: raw wool just plucked delivered to Ahu-waqar; ARMT 23, 95: receipt of raw wool just plucked.

57 See for example ARMT 23, 72. These operations are explained by Bardet 1984, pp. 5–15 who

published 23 texts dealing with this topic. Other techniques are also attested. See ARMT 22, 72 in which 12 women have made a test to 'blow' *tuhšūm*-wool; M. 10023 (Durand 2009, 283): 2 ½ minas of second quality wool delivered to Kāpi-la-rīm in order to clean by 'blowing'.

58 ARMT 22, 50.

59 M. 7313 (Durand 2009, 216, Yasmah-Addu): 4 ½ minas of 'aired' (*napšatum*) wool from the female weaver Punzi and 3 ¾ minas 5 shekels of 'aired' wool from the female weaver Šurunna, receipt by Hissali. The 'airing' of the wool is also attested in the middle Assyrian documentation, see Postgate in this volume. For the 'airing' of wool and textiles against moths, see Michel 1998.

60 This was suggested by C. Breniquet who showed me several samples from contemporaneous Asia.

61 T. 543 (Durand 2009, 199, Sumū-Yamam): 3 minas 10 shekels of teased wool (*pušikkum*); M. 7112 (Durand 2009, 286): 15 shekels of teased wool; ARMT 21, 337: account of teased wool. Durand 2009, 287 translates *pus/šikkum* by 'laine cardée', but carding needs special equipment made in metal for which we have no trace in the Ancient Near East; this technique is in fact used 'to air' wool, but is not attested for the 2nd millennium BC. Teasing wool is done by hand (in the French countryside, the technical word is 'écharpillage'); wool is teased to make a band that is later rolled onto the distaff.

62 ARMT 24, 179 mentions the receipt of combed wool by Zimrī-Šamaš from Rahatum. The verb *mašādum* is also attested in the Old Assyrian sources (TC 3, 17) as well as the word *muššum*, 'comb': OIP 27, 55; TC 3, 159:9; TC 3, 193:3; CCT 3, 31:29. Combing allows aligning wool fibres. Note that in southern Babylonia, girls sometimes received combs for wool in their dowries (BE 6/1 84, see Dalley 1980, 60–61).

63 Bardet 1984, 152, and ARMT 21, 313–314, but see Durand in ARMT 21, 376.

64 Rouault 1977; Kupper 1991, 48.

65 Veenhof 1972, Michel 2006b, Michel *in preparation*, chapters 3 and 4.

66 KTS 1, 45a concerns a credit of Enlil-bāni to Laqēpum; its envelope was sealed by Dan-Aššur, son of Puzur-Aššur, by Dadā, son of Aššur-imitti (= seal B), and by Laqēpum, son of Šū-Aššur, and presents three sealings. Note that an animal (a bovid) wears the same type of twilled garment as the deity and other male figurines. I address all my thanks to Veyssel Donbaz who gave me his photo of this sealing.

67 Michel, *Estimating an Old Assyrian Household Textile Production with the Help of Experimental Archaeology: Feasibility and Limitations*. Contribution at 'Traditional Textile Craft – an Intangible Cultural Heritage?' The Jordan Museum, Amman, Jordan, 24th–31st March 2014 (<http://www.traditionaltilecraft.dk/>).

68 However, Dercksen 2004, 16 suggested that centralized and institutional production did exist. For the Middle Assyrian sources, see the contribution of Postgate in this volume.

69 Ank. 14–3–80 (Günbattu 1987, 197), and TPAK 1, 143; both texts are quoted by Dercksen 2004, 14–15.

70 Veenhof 1977, 114, note 18

71 Ismail 1991, No. 81: 24 minas 14 shekels of first quality wool, 1 talent 1 mina of second quality wool, and several garments, some of them made of linen.

72 ARMT 25, 493 (collations and new edition as ARMT 31, 268).

73 FM 2, No. 49, see Durand 1994, 87–88.

74 Joannès 2006, No. 103.

75 Ismail 1991, No. 103.

76 Kupper 1982b, 165, n. 14 quotes many texts witnessing wool purchases by the Mari palace. Kupper 1990, 43; ARMT 21, 220 (partly broken) lists several wool purchases.

77 ARMT 21, 216 mentions ¾ mina 2 ¾ shekels of silver to buy 12 talents 14 minas 15 shekels of wool. ARMT 18, 39: second quality wool and coarse wool from sheep bought to Yahatī-El, 1 talent 22 minas of second quality wool, 32 talents 58 minas of ordinary wool from the sheep purchased which have been plucked in the estate of Yagatti-El.

78 See below M. 11281 (Durand 2009, 312). See also M. 11269 (Durand 2009, 294) for the purchase of goat hair to Buqāqum from Suhūm. According to ARMT 26/2, p. 401, n. 5, Buqāqum possessed flocks since he sold wool (M.11269, Durand 2009, 294) or brought some (M.10385, Durand 2009, 344).

79 ARMT 18, 20 (LAPO 16, 135); Rouault 1977 (LAPO 16, 136) ^{14–18}*mi-nu-um an-ni-it-[t]a-an ša a-na sig-há lú ká-dingir-ra^{ki}, ta-at-ta-aš-ka-na-ma ù tu-da-ba-ba-ni-ne, pa-na-nu-um i-nu-ma ia-ah-du-un-li-im, ^{1d}utusi-^{qim} ù la-ás-ma-ah-^{qim}, a-na sig-há lú ká-dingir-ra^{ki} ma-a i-qa-al-lu (...)* ^{21–25}*i-na sig-há ša bu-qú-um é-kál-lim, ma-li i-ba-aš-še-e sig-há ma-li túg ša-a-tu, a-na na-sa-qí-im ú-lu i-ba-aš-se-e, [i-n]a-[an-n]a a-na sig-há lú ká-dingir-ra^{ki}, mi-i[m-m]a la ta-qa-a-al.*

80 M. 20211, quoted as Salle 143, 80 by Kupper 1982a, see below n. 111. See Also A. 2500+ (LAPO 18, 926) in which a merchant from Emar owed wool.

81 FM 2, No. 57 (Durand 1994, 98–99): 6–7, 8–9, 2'-4', *be-l[íki] a-am iš-pu-ra-am um-ma-a-mi aš-šum sig-[há], ša ta-aš-pu-ra-am l[ú-meš] ša-pí-tú-ú a-na sig-há [w]u-ú-ru-ú (...)* *i-na ma-[hi]-ra-at*, 40 *ma-na š[á] a 3*

½] *ma-na* kù-babbar_{pf}-kà sîg *ša-am-ma* (...) sîg-há *ma-li* dam-gàr, [*ar-tu-ub* *ša-m*]*a-am* ù kù-babbar *a-na* lú dam-gàr, [*ad-di-in* *i-n*]*a* *a-na* *ša* 3 ½ *ma-na* kù-babbar (...)

82 Vincente 1991, No. 415, eponym Habil-kēnu.

83 OBTR 202–203.

84 ARMT 22, 93 (ZL 5): 18 minas of coarse wool from the plucking of 40 sheep to be plucked. ARMT 22, 94 (ZL 5): 20 minas of coarse wool. ARMT 22, 95 (ZL 5): 20 minas of coarse wool. M. 6032 (Durand 2009, 265, xii ZL 4): 22 ⅔ minas of coarse wool. M. 11539 (Durand 2009, 316, i ZL 6): first and second quality wool from the plucking of 10 white sheep that were in the court.

85 Rouault 1977, see above n. 79.

86 TH 82–144 (Charpin 1985, 454), mentions wool plucked on sheep from the fattener, and on palace sheep.

87 In ARMT 27, 37, Qatṭunān's governor explains that, following the orders of the king, he has gathered the palace flocks and proceeded to the plucking of the sheep. The wool collected was then transported on wagons to Saggarātum. M. 10376 (Durand 2009, 462) is an account which gives the amounts of various qualities of wool, which were the proceeds of the plucking of 300 sheep at Qatṭunān.

88 See Van Koppen 2002, 309, and text ARMT 23, 583 which mentions the receipt of 23 minas of first quality wool from the plucking of Sammētār's flock at Terqa.

89 Kupper 1990; Durand 1997, 206; Marti 2008.

90 M. 15093 (Durand 2009, 394), [3]0 *ma-na* sîg úš, *ša i-na* udu-há, *ša su-ga-gu-ut* *i-ba-al-pf-an*, lú *ša-ki-da-an*, *ša i-na* *ki-sa-al*, giš-giššimmar, *ib-ba-aq-mu*, *te-er-di-tum*, *a-na* *Mu-ka-an-ni-ši-im* (ZL 11). M. 11950 (Durand 2009, 342–343) concerns in all 8 talents 51 ½ minas of wool from the plucking of the *sugāgūtum* sheep of Hammān, the *sugāgum* of Dêr. See also the transfer of 100 sheep from the *sugāgūtum* tax of Hālī-hadun, M. 11558 (FM 10, No. 30), and of 10 rams from the *sugāgūtum* tax of Hayya-Addu, M. 12336 (FM 10, No. 35). Memū'm, a Hanā nomad, paid only half of his tax, he still owes 50 sheep to the king, meanwhile he is in jail (FM 2, No. 52). The levy of a tax on the flocks grazing in the Tharthar area is suggested to the king of Mari (FM 6, No. 24); this could correspond to another type of tax.

91 ARMT 1, 191 (LAPO 16, 81):5–11, 16–24 (restitutions by J.-M. Durand) *i-<na> pa-nit-tim su-ga-gu-ut*, *la-i-īl^{ki} la-ta-rum i-pu-ūš*, *ù la-ta-rum a-na ši-ma-ti-šu*, *it-ta-la-ak i-na-an-na* 5 lú-meš, [*i-na re*]-*ša-tim* lú-meš *la-i-la-yu^{ki}*, [*ù x* lú-meš *ša*] *hi-ib-ri-im*, [*a-na še-ri*]-*ia il-li-ku-nim-ma* (...) [*la-ar-ka*]-*ab-dim*, [*a-na pu-uh la-ta*]-*ri-im*, [*a-na su-g*]-*a-gu-ut*, [*la-i-īl^{ki} āš-ta-kan*, [*x ma-na*] kù-ba[bar] *ù* 5 me udu-há, [*i*]-*n[a-aš]-ši*, [*la-u-há ša la-ta-r*]-*i-im*, [*x ma-na*] kù-babbar *ù x* me] udu-há, [*a-ma-ah-ha-a*]-*r-šu*.

[2] *ar-ha* 22, 99: more than 3 talents of wool correspond to Yar'ip-El's overdue payment (ZL 5).

93 M. 6108 (Durand 2009, 289) is a receipt of 2 ⅔ minas and shekels of silver, at the time of the *sugāgūtum* of Gabūm of Humsān, to buy wool; for the same *sugāgūtum*, see FM 10, No. 86.

94 Kupper 1990. For the *miksum* tax paid by the Almutū, see Durand 2000, 67, a.

95 M. 6386 (Durand 2009, 427): 10 talents of wool and 40 talents of goat hair originating from the *igisum* tax have been entrusted to Mukannišum. For *igisum*, see Durand 2000, 115–119.

96 Durand 1997, 125.

97 Lerouxel 2002 notes the important role played by garments in diplomatic gifts (see below).

98 M. 11426 (Durand 2009, 316):1–4, 14 *ma-na* sîg sag, 1 gu 40 *ma-na* sîg úš, mu-tù *Ga-bi-i-im*, si-lá *Ma-ši-im* (ZL v 6). See also T. 543 (Durand 2009, 199): *šurubtum* of 3 minas 10 shekels of teased wool (Sumū-Yamam); M. 10379 (Durand 2009, 267): *šurubtum* of first quality wool (Terqa, ZL 5); M. 9783 (Durand 2009, 315): *šurubtum* of 10 minas of first quality wool (Mari, ZL 6); M. 15096 (Durand 2009, 317): *šurubtum* of 10 minas of first quality wool (Terqa, ZL 6); M. 11981 (Durand 2009, 323): *šurubtum* of textiles, 20 minas of superior quality wool, and 7 talents 40 minas of second quality wool (ZL 6); M. 10385 (Durand 2009, 344): *šurubtum* of first quality wool (ZL 6).

99 Durand 2000, 347.

100 ARMT 1, 83 (LAPO 16, 255):34–39, *a-na a-ha* ʾBuranum, *ur-ra-du-nim*, *ù i-nu-ma i-na pu-ra-sà-tim*, udu-há *šu-nu i-ša-aq-qú-ū*, *i-nu-mi-šu ši-ih-tà-am* gal, *iš-ša-hi-tú*. There are several other letters dealing with the plundering of sheep: ARMT 1, 91 (LAPO 16, 321); ARMT 6, 27 (LAPO 16, 424); ARMT 14, 84+ (LAPO 17, 700); A. 1025 (LAPO 17, 545); A. 3757 (LAPO 17, 603); M. 9157 (LAPO 18, 924); M. 11009+11010 (LAPO 18, 1084).

101 See Eidem 2011, No. 171 according to which *habbātum* are plundering the country of Numhum; the sheep flocks have been moved away. Eidem 2011, No. 92, mentions that there has been no plundering of people and sheep.

102 M. 18159 (Durand 2009, 416, ZL 13).

103 Michel and Veenhof 2010; Lassen in this volume.

104 Grayson 1987, A.O.39.1:59–72, *i-nu-ma* ē^aEn-líl, *be-lí-ia*, *e-pu-šu*, *ki-lam a-li-ia* *A-šur^a₄^{ki}*, *a-na* 1 gín kù-babbar, 2 gur še, *a-na* 1 gín kù-babbar, 15 *ma-na* sîg, *a-na* 1 gín kù-babbar, 2 bán ì, *i-na ki-lam a-li-ia*, *A-šur^a₄^{ki}*, *lu-ù iš-ša-am*.

- 105 Durand 2009, 142–155
- 106 M. 6700 (Durand 2009, 447) quotes first and second quality wool. Such qualities are also attested in the Tell Leilān sources: Ismail 1991, No. 81 and following texts. For coarse wool at Mari, see T. 99 (Durand 2009, 197); T. 474 (Durand 2009, 199); M. 6088 (Durand 2009, 216); ARMT 21, 323. For other qualities of wool, see ARMT 25, 179; M. 6969 (Durand 2009, 519); M. 11539 (Durand 2009, 316).
- 107 For *tuhšūm*-wool, see Durand 2009, 153–155. This type of wool also occurs at Tell Rimah. The letter OBTR 129 to Iltani quotes dye, alum and *tuhšūm*-wool.
- 108 M. 11894 (Durand 2009, 518): wool from Amorite sheep and wool from sheep fattened with flour.
- 109 Durand 2009, 152. See, however, ARMT 24, 175, an account of wool which mentions 1 mina of *nabāsum*-red wool.
- 110 FM 2, No. 57, cited above n. 81.
- 111 15m:1s, in to M. 20211 (Durand 2009, 404, ZL 12, text previously known as Salle 143, 80, cited by Kupper 1982a, 117). Durand, in his abstract of the text, translates *gū* by ‘bale’ instead of talent in order to avoid a too low price for wool: “50 ballots de laines diverses achetés pour 2 mines d’argent en 2 (lots d’)achats de 25 mines chacun, d’après de [NP] le marchand d’Imār”. But it is never stated that there are two lots of wool, and the expression ‘*ina mahirat x gū/mana ām*’ is always translated as ‘at the rate of x shekels/minas (of the given commodity) each (shekel of silver)’.
- 112 20m:1s, in M. 11281 (Durand 2009, 312, ZL 5).
- 113 17 ¼–17 ½ m:1s in ARMT 21, 216 (comments on pages 189–190).
- 114 15m:1s, in the following texts: ARMT 22, 262; Salle 143, 3; M. 15098 (Durand 2009, 300); M. 18147 (Durand 2009, 351); M. 6376 (Durand 2009, 305); M. 11904 (Durand 2009, 298). Again (see n. 111), the editor of this last text translates *gū* by ‘bale’ and not by ‘talent’: “4 mines d’argent (pesé) aux poids du marché pour l’achat de 60 ballots de laine pour les 600 étoffes que les particuliers ont produites”, considering that each textile weighed 4 minas, and that we should have a total of 40 and not 60 gu. However, we have to understand that each textile was woven from 6 minas of wool because the price given here, 60 talents of wool for 4 minas of silver, corresponds to the standard price of 15m:1s. The same rate is attested for second quality wool in ARMT 22, 96; ARMT 22, 262 (col v).
- 115 Ismail 1991, No. 103 (see above n. 26).
- 116 1m:1s in M. 11780 (Durand 2009, 293): 1 shekel of silver for 1 mina of first quality *tuhšūm* wool; M. 8208 (ARMT 21, p. 376; ARMT 23, p. 8 n. 6; Durand 2009, 296): ½ shekel of silver for ½ mina of *tuhšūm* wool. Also 1 ⅓ m:1s in M.11782 (Durand 2009, 281): ½ shekel of silver for ⅓ minas of *tuhšūm* wool.
- 117 M. 10699 (Durand 2009, 450).
- 118 Joannès 2006, No. 67:13–18, 5 *ma-na* *síg-há*, *ma-har Nu-úr-i-lí-šu*, *a-na* *kù-babbar el-qé*, 1 *gín kù-babbar ar-hi-iš*, *šu-bi-la-am-ma*, *lu-pu-ul-šu*: “I had to buy the 5 minas of wool (which were) at the disposal of Nūr-ilīšu. Send me quickly 1 shekel of silver so that I can pay (it)”.
- 119 CUNES 55–01–008, Owen 2012, 446–450.
- 120 Dercksen 2004, 184, table 10.1. See also AKT 4, 52:6 minas of (soft) wool for 1 shekel of silver; Kt 93/k 236: 10 talents of wool for 2 minas of silver (5m:1s); same rate in TPAK 1, 36:5–6. For other examples, see Lassen 2010, 172.
- 121 Roth 1997, LE §1.
- 122 Michel and Veenhof 2010, 215.
- 123 Veenhof 1972; Michel 2001 (ch. 7); Michel 2006b; Thomason 2013.
- 124 Lacambre 2008.
- 125 Chambon 2009.
- 126 Durand 1983, 59–86; Ozan 1994.
- 127 According to ARMT 26, 284, Ušur-awassu had to manage the distribution of wool rations to the palace personnel. See also ARMT 22, 100 about the allocation of wool from the office of Ušur-awassu to the great priestess of Dagan.
- 128 M.11782 (Kupper 1982b, 165, note 14, Durand 2009, 281): ½ shekel of silver for the price of ⅓ minas of *tuhšūm*-wool received by Dan-El, *túg-duš*; M. 11780 (Durand 2009, 293): 1 shekel of silver for the price of 1 mina of first quality *tuhšūm*-wool received by Iddi, same amount received by Šilli-Annu; M. 6784 (Durand 2009, 286): 10 shekels of silver according to the weight of the market to purchase *tuhšūm*-wool; M. 11904 (Durand 2009, 298): 4 minas of silver weighed with the weights of the market to buy 60 talents of wool which corresponds to 600 textiles. All these samples are dated to ZL 5.
- 129 M. 7106 (Durand 2009, 264, xii ZL 4): 10 shekels of silver for the purchase of *tuhšūm*-wool given to Mukannišum in the presence of the king; ARMT 25, 170 (collation and new edition in Durand 2009, 265): 1 ⅓ minas 4 shekels of silver received by Mukannišum. These two texts are dated to ZL 4.
- 130 M. 11281 (Durand 2009, 312), 1 *ma-na* 12 su [kù-babbar], *a-na ši-im*, 23 *gú* 54 *ma-na* *síg*, *i-na ma-*

- hi-ra-at*, 20 *ma-na* àm, *ša it-ti Ia-tar-an*, *ù Ia-si-im-ha-mu*, *lú Su-ha-yu^{ki}*, *iš-ša-mu*, *i-na di-im-ti-im*, *ša Zi-ip-pa-ta-an*, *ib-ba-aq-ma*, *a-na Mu-ka-an-ni-ši-im*, *ru-ud-da-a*, [6 su] *lu-ud-d[i-in]*, *gir Mu-ka-an-[ni-ši-im]*, [*ù Ma-n*]-*u-m-ša-ki*-[*ma-a-bi*], (ZL 5).
- 131 M. 11735 (Kupper 1982b, 578, Durand 2009, 335), 1 *ma-n*[a x su kù-babbar], *a-na ši-im*, 20 *gú síg*, *ša it-ti Me-ep-ti-im*, [i]š-ša-mu, [g]i[r *Ul-lu-ri*, [s]i[g *a-na Mu-ka-an-ni-ši-im*, *i-na-da-a?* (text dated to ZL 6). See also M. 11735 (ARMT 30, 335) concerning the deposit 20 talents of purchased wool in Mukannišum's office (text dated to ZL 6).
- 132 ARMT 22, 262:v1-10, *šu-nigin* 2 ½ *ma-na* 2 *gin kù-babbar*, *ip-te-er*, 13 *lú-meš*, 6 *munus-meš*, *a-na ši-im*, 38 *gú síg uš*, *i-na ma-hi-ra-at*, 15 *ma-na* àm, *a-na síg-ba lú-túg-meš*, *ù munus-uš-bar-meš*.
- 133 ARMT 23, comments on page 501; Kupper 1982b, 171.
- 134 ARMT 25, 334 (collations and new edition in Durand 2009, 360–361), *tu-pa-at kù-babbar*, *ši-im síg-há urudu*, *ù anna*, *ša Mu-ka-an-ni-šum*, *i-na a-hu-ne-e*, *iš-ta-a-mu*, *kù-babbar a-na zi-ga-š[u]*, *Mu-ka-an-ni-šum*, *iš-ši*, *aš-šum bu-ul-lu-uš*, *síg-há urudu* *ù an-na*, *níg-šu Mu-ka-an-ni-šum*, *tu-pa-tum an-ni-ta-an*, [*š*]-*a-ak-na i-nu-ma ni-pi-š*, [*ni*]-*ka-si i-na pa-pa-ah*, [*š*]-*a ki-sa-al giš-g[išimm]*ar, *igi lugal* (ZL 7).
- 135 T. 99 (Durand 2009, 197); T. 474 (Durand 2009, 199).
- 136 ARMT 24, 177; M. 8394 (Durand 2009, 374).
- 137 Receiving wool: M. 8529 (Durand 2009, 460); M. 5894 (Durand 2009, 473); M. 5060 (Durand 2009, 479). Delivering wool: M. 6393+9068 (Durand 2009, 455); M. 12002 (Durand 2009, 475); M. 6384 (Durand 2009, 476); M. 7302 (Durand 2009, 478).
- 138 Yar'ip-El, Ahu-waqar, Idin-Mamma: ARMT 22, 88 (ZL 5) and M. 6643 (Durand 2009, 279, designated as *ša túg barkar-ra*) both dated to ZL 5. Idin-Mamma: M. 5988 (Durand 2009, 280, ZL 5) and M. 5982 (Durand 2009, 318, ZL 6). Ahu-waqar: ARMT 22, 91 (ZL 5) and ARMT 22, 96 (ZL 5); in this last text he is qualified as specialist in *barkarrum*. Yar'ip-El: M. 6032 (Durand 2009, 265, ZL 4); ARMT 22 92 (ZL 5); M. 5992 (Durand 2009, 319, ZL 6); ARMT 21, 323 (ZL 2); M. 6623 (Durand 2009, 277, ZL 5).
- 139 Thread for weaving: M. 5972 (Durand 2009, 223, ZL 2); M. 5939 (Durand 2009, 224, ZL 2); ARMT 21 332 (ZL 3); ARMT 21, 332 (ZL 3); ARMT 21, 337 (ZL 5); M. 6467 (Durand 2009, 317–318, ZL 6), M. 6700 (Durand 2009, 447); M. 10841 (Durand 2009, 450); ARMT 21, 351; 359; ARMT 22, 103; 106; 107; ARMT 23, 234; 373; 459; 583; 597–605; ARMT 24, 177; 180–181.
- 140 TH 80–117 (Charpin 1985, 454): *hu-pa-at síg*, *ù túg-há nam-ha-ra-a*[t PN]. The tablets which have been discovered in rooms I, II and XV were kept in baskets mainly containing accounts of textiles, food and servants. In the wool receipts and cloth distributions, a woman called Yamama is frequently mentioned; she was clearly the head of a female weavers' team. According to the sealing on TH 82–218 (Charpin 1985, 454, 456), Yamama was a princess, daughter of Yaḥdun-Lim and wife of Asqudum.
- 141 TH 82–196 (Charpin 1996, 222), and TH 82–144 (Charpin 1985, 458).
- 142 TH 82–172 (Charpin 1985, 454, 459).
- 143 Charpin 1985.
- 144 ARMT 22, 84: 7 ⅔ *ma-na síg uš*, *šu-ti-a Iš-hi-E-ra-ah*, 10 *ma-na síg uš*, *šu-ti-a*, *İs-ka-ta-an*, 8 *ma-na síg uš*, *a-na gú-há*-[è]-a, [*š*]-*u-ti-a A-bi-Sa-ma-ás*. Several documents deal, for example, with the weaving of coarse barkarrum-textiles: M. 6088 (Durand 2009, 216, Yasmah-Addu): 16 minas of coarse wool, weight of 4 b.-textiles of 4 minas each; ARMT 21, 323 (ZL 2): 1 talent 13 minas of coarse wool, weight of 22 b.-textiles; M. 6393+9068 (Durand 2009, 455). ARMT 9, 276: 50 minas of coarse wool, weight of 12 b.-textiles; M. 12002 (Durand 2009, 475): 4 minas of wool, weight of a b.-textile; M. 6384 (Durand 2009, 476): 9 ⅓ minas of wool, weight of a second quality textile and a b.-textile. See also ARMT 22, 97 (Yasmah-Addu); M. 730 (Durand 2009, 478). *Hurrum*- and *uṭublum*-textiles: M. 10430 (Durand 2009, 456): x minas of wool, weight of 2 h.-textiles and 16 minas, weight of 3 barkarrum-textiles; M. 12397 (Durand 2009, 447): 18 ⅓ minas of wool, weight of 5 h.-textiles and an u.-textile; ARMT 23, 459: ½ mina of wool, weight of a u.-shawl. Harrurum-textiles: ARMT 22, 89 (ZL 5): wool to make a h.-textile for a blanket; ARMT 22, 90 (ZL 5): wool to make a h.-textile for a blanket; M. 6623 (Durand 2009, 277, ZL 5): wool for h.-textiles for blankets. Guššum-textiles: ARMT 24, 177 (ZL 8): 5 minas of wool, weight of a g.-textile. Various textiles: M. 8550 (Durand 2009, 216, Yasmah-Addu): ½ mina 3 shekels of first quality wool to make shawls; ARMT 12, 324 (ZL 2): wool to make a *hayy*um-carpet; M. 5312 (Durand 2009, 231, ZL 2): 2 minas of second quality wool to make socks(?); M. 12217 (Durand 2009, 320, ZL 6): 1 talent ½ mina of *tuhšum*-wool for a tent; ARMT 22, 84 (ZL 2): second quality wool to make garments in *tuhšum*-wool; M. 6092 (Durand 2009, 232, ZL 2): 20 minas of wool for 5 textiles of 4 minas each; M. 11591 (Durand 2009, 474): 10 minas of wool, weight of 3 *šusippum*-bands; M. 11714 (Durand 2009, 471).
- 145 For example, ARMT 21, 337.
- 146 FM 6, No. 13.
- 147 A. 1285 (Rouault 1977, LAPO 16, 136, see above note 77 for a quotation of lines 14–18, 21–27):4–

5, 37–54, *aš-šum túg ta-ad-dé-e-tim e-pé-ši-im, ú-wa-e-er-ka-a-ma* (...) *ar-hi-iš túg šu-ú a-na pa-ni-ia li-in-ne-pf-iš, à a-na* ¹⁰*túg à munus* *túg dan-na-tim šu-ku-un-ma, [t]úg šu-ú ki-ma túg Tu-ut-tu-bé-e-em šu-ta-a-am, à bi-it-tam dam-qf-iš lu-ú na-sí-iq, à lu- <ú> ka-ši-ir à ki-ma ru-uq-qf-[i]m ša kù-babbar, li-ib-bi túg ša-a-tu lu-ú i-ba-aš-ši, túg šu-ú šu-ni Ya-am-ha-di-i iš-ša-ak-ka-an, à ki-ma túg hu-úš-še-e-em šf-ir-pu-um, in-na-ad-di-i x as-su-ur-re, a-na túg ša-a-tu [ša]-te-e-em, à bi-it-tam uš-ta-ba-at-tu-ma, à i-na zu-na-tim ša-ka-ki-im, zu-na-tum i-ka-ab-bi-ta-ma, à túg uš-ta-ar-ra-at dan-na-tim, šu-ku-un-ma a-na túg šu-ú, a-na pa-an i-[n]a-tim [ša] ma-tim ka-li-ša, iš-ša-ak-ka-an. See also ARMT 18, 6 (LAPO 16, 133); ARMT 18, 20 (LAPO 16, 135); ARMT 13, 10 (LAPO 16, 10).*

148 Lerouxel 2002 for Mari. For Tell Leilān, Eidem 2011, 60–65 gives a detailed list of events that took place according to administrative texts (L.87); among these, several records mention textiles given to kings.

149 ARMT 21, 348: cloth given by the king of Zurrā for Zimri-Līm of Mari. Textiles were also numerous in the dowries given to the future wives of Mari kings. A letter found at Hašor mentions the content of the dowry of a princess of Qatnā to be married to Yasmah-Addu of Mari, see Hazor No. 12 (Horowitz and Wasserman 2004, 338–340; Horowitz and Oshima 2006, 83–85).

150 However, as noticed by Lerouxel 2002, 442, when the king of Mari sent South and East textiles made in the western regions these gifts entered the circulation of economic exchanges.

151 Lerouxel 2002, 456.

152 OBTR 82:12–16, *i-na-an-na túg-há, ša i-na qa-ti-ki i-ba-aš-šu-ú, lu-ú sag lu-ú uš, a-na qf-ša-tim, ar-hi-iš šu-bi-lim*. See also OBTR 70 in which Aqba-hammu needs garments for his tribute to Babylon.

153 For the economic role of woolen fabrics in the ration system, see Breniquet 2013, 18.

154 Durand 1985, 394; Ziegler 1999, 22–26.

155 FM 4, Nos. 5–10, 12.

156 FM 9, No. 31: female musicians of Rišiya's office used to receive 8 minas of wool each; they were now asking for 10 minas.

157 T. 241 (Ziegler 1999, 37–38, note 69, year Ekallatum).

158 FM 5, No. 10.

159 M. 9884 (Durand 2009, 457): 2 textile specialists at 4 minas each; see also ARMT 22, 262:col v.

160 ARMT 23, 612: wool allocations for 10 cooks, 9 male and 1 female.

161 ARMT 23, 377: allocation of 8 minas of wool for 3 brewers and of 9 minas for another person.

162 M. 15098 (Durand 2009, 300, ZL 5): 2 $\frac{2}{3}$ shekels of silver, price of 40 minas of wool to give as allocations to 9 stablemen; ARMT 22, 48: list of 8 stablemen who should receive wool.

163 M. 18147 (Durand 2009, 351, ZL 7): 2 talents of wool bought with 8 $\frac{2}{3}$ shekels of silver for wool allocations of the 11 sedan-chair carriers of Inib-šunu: 10 minas each, the remainder of the wool is for the allocations of the palace (given to Mukannišum).

164 M. 6797 (Durand 2009, 461): distribution of allocations of 10 minas of coarse wool to Dadum, the ploughman.

165 ARMT 5, 71 (LAPO 17, 783, Yasmah-Addu): Hāliya writes to the king explaining that there was no delay in the distribution of the allocations to shepherds and cowherds, contrary to what Zikrī-Eštar had reported.

166 ARMT 27, 6; ARMT 23, 51 (ZL 4); M. 12176 (Durand 2009, 455–456); ARMT 23, 51 (ZL 4).

167 ARMT 1, 52 (LAPO 16, 1).

168 ARMT 22, 100 (Yasmah-Addu).

169 Eidem 2011, No. 140:9–12, *ú-lu-ú še-ba ú-ul ni-ma-ah-ha-ar, ú-[l]u-ma síg-ba ú-ul i-na-ad-di-nu-/né-ši-im, à ku-uš-šú-um, ik-ta-aš-dam*. See also Eidem 1992, 24.

170 For the economy of wool within Anatolia, see the contribution of Lassen in this volume.

171 See the contribution of Postgate in this volume.

14. Wool in Anatolia in The Old Assyrian Period

Agnete Wisti Lassen

The written record of the Old Assyrian Period (c. 1970–1715 BC and corresponding to the early Middle Bronze Age in archaeological parlance) offers a wealth of information about economic and social life in an extensive network of Assyrian trading settlements located in present-day Turkey. Most of this evidence comes from the archaeological site of Kültepe, the ancient city of Kaneš, where an Assyrian trading colony has been uncovered as part of the large and densely settled urban centre.

Some 23,000 inscribed objects have been unearthed at this site so far, providing substantial evidence for a long-distance international trade in tin and luxury textiles conducted by the Assyrians. The only portion of this larger trade system which is documented in any detail is the one between northern Mesopotamia and Central Anatolia, which was managed directly by the Assyrians. But some of the goods they traded, such as the tin and lapis lazuli, came from as far away as Central Asia.¹ Most of the surviving documentation is thus concerned with the caravan trade between Aššur in present day Iraq and Central Anatolia. However, in recent years scholars have also begun to realise the economic importance of an extensive circuit of trade in local goods managed by the Assyrian traders within Anatolia. This trade involved three main commodities: copper, locally produced textiles and wool.²

The Assyrian merchants were not the only ones involved in this local trade, and for instance, we find occasional references to ‘professional’ wool traders with the title *ša šaptim*, who appear to be of Anatolian background.³ However, in general terms, the wool trade is overwhelmingly dominated by the Assyrians in the surviving texts, which gives grounds for speculation about 1) how representative our written sources are, 2) whether and how wool was distributed within Anatolia on a large scale before the Assyrians entered the scene around 1950 BC, and 3) how the Assyrians came to be so active in this bulky and rather inexpensive material.

As suggested by Barjamovic, it is possible that significant changes in the political organization of Central Anatolia between the late 3rd millennium BC and the Old Assyrian period had an impact on the nature of foreign contacts.⁴ The arrival of the Assyrian merchants signified a change from centralized and politically motivated interaction to a situation in which a more fragmented political landscape allowed a group of neutral foreign merchants to establish a bulk trade in certain local goods. Based on their long-distance trade, the Assyrian merchants

already had extensive knowledge and infrastructure in place within Anatolia, which they could also exploit in a local trade, even though their network was not initially developed with that activity in mind.



Figure 14.1. Map of early second millennium Anatolia, according to the reconstruction by Barjamovic 2011. Map by author.

In a recent article, I have argued that the Assyrian wool trade in Anatolia was concentrated in three major hubs, which functioned as central markets for their respective hinterlands: an eastern, a northern and a western one.⁵ I argued that the function of the intra-Anatolian trade in copper and wool was as an optional ‘add-on’ to the long-distance exchange, which sought to exploit local price fluctuations in certain commodities to increase profits on the main traffic in tin and imported fabrics. As shown by Dercksen,⁶ such a trade could be organized e.g. through a chain of exchanges of varying qualities of copper in the copper producing areas near the market town of Durhumit, and ultimately, the sale of this copper in the market of Puruṣhaddum far to the west.⁷

Wool, unlike copper, was more or less universally available in Anatolia, and I suggest that the integration of the wool-trade into the Assyrian network depended mainly on a fluctuating supply situation. Wool could be obtained in the east or around Durhumit and exchanged for copper, which would then be sent on to Puruṣhaddum for sale. At the same time, it was also possible to buy wool with copper, and sell the wool for silver in Puruṣhaddum. In this way, wool was a flexible commodity, and could be inserted as an added ‘circuit’ or layer of transactions into the usual series of exchanges at any point.

The extant prices for a talent (c. 30 kg) of wool in Anatolia ranged between 6 and 36.7 shekels of silver (1 shekel = c. 8 g.), but they fall into three clusters: 10–12, 16–20, and 30 shekels of silver per talent of wool respectively.⁸ The average price was 16.5 shekels per talent, but 10 and 12 shekels of silver are the most commonly attested prices and seem to represent standard prices for an ordinary talent of wool.

Few purchase prices are attested, but there is a clear tendency for the average

sale prices to be higher than the purchase prices, as would indeed be expected. The most expensive type of wool was soft wool (see below). When offered for sale, it could fetch around 30 shekels of silver per talent, and cost about a third of that when purchased.

There is no apparent pattern in the geography of the wool prices. The two lowest prices are found in Luhuzattiya and Hurama in the east, but a high price is also found in that area.⁹

Most transactions in wool were relatively small, involving less than 10 talents (300 kg). However, a small number of transactions stand out as truly large, the largest single operation dealing with as much as 15 tons of wool.¹⁰ In this particular case, however, the amount of wool must be deduced on the basis of the average wool-to-copper exchange ratio, since only the amount of copper paid for the wool figures in the records. Specific examples of large quantities of wool being traded include 57 talents (c. 1.7 tons) bought in the city Luhuzattiya,¹¹ and a transaction involving 80 talents (c. 2.4 tons) of white wool and 20 talents (c. 600 kg) of red wool.¹²

Little information is available about the origin or organization of the Anatolian wool production. Only a single text shows that the Assyrians were involved in procuring wool,¹³ and administrative titles in Anatolian institutions, such as *rabi re'ē*, 'chief of the herdsmen',¹⁴ *rabi ašlakē*, 'chief of the fullers'¹⁵ and *ašlakum ša ruba'im*, 'the king's fuller'¹⁶ suggest that a large institutionally organized production of textiles took place in Anatolia.

In addition to their wool, sheep were also used for their meat,¹⁷ as offerings,¹⁸ and as a trade commodity.¹⁹ A handful of designations for sheep occur in the texts, but it is difficult to determine whether they specify breed, age or something else).²⁰ The so-called *šuppum*-sheep, which were supposedly characterized by a white and curly fleece, could have been used for wool production.²¹ Some sheep are labelled as 'Akkadian',²² which must refer to a breed that the Assyrians recognized as coming from Southern Babylonia,²³ and which would have been introduced to Anatolia from there.²⁴ The most common types are *lakannum* and *silqum*, which often appear in lists of provisions, alongside bread (counted in multiples of 50, 60 and 100 loaves), and jugs of beer.²⁵ As stated by Veenhof, these numbers seem too substantial to relate to a single family, and the texts could reflect a system of collective provisioning,²⁶ or perhaps as an accumulated bill, a 'running tab', at the butchers and bakers.²⁷

Wool appears in the documentation primarily as a trading commodity. Information about procurement, processing and consumption is sparse, but details can be gleaned from the use of certain adjectives in the written record. In most cases, wool (Assyrian *šāptum*) is not described or qualified in any way. When it is, the most common designation is 'soft' (*narbum*).²⁸ The technical meaning of this term is unclear, but it is probably a descriptive designation of wool that had been subject to a particular preparation technique, or came from a certain breed of sheep, or part of the fleece. The term appears alone, or alongside the designation 'good' (*damqum*).

Rather than being descriptive, the latter belongs to a hierarchy of qualities ranging from 'extra good' (*damqum watrum*) to 'inferior' (*maṭium*), which was applied more broadly to Old Assyrian trade goods.²⁹ Only the better qualities, 'good' and 'extra good', are attested for wool.³⁰ Another descriptive designation is

‘long’ (arkum).³¹ ‘Long’ wool presumably refers to fibre length, and it is indeed possible to separate the longest fibres from the bulk of short ones by carefully combing it. By using the right type of spindle whorl, long woollen fibres can produce a very thin but still strong thread – qualities fit for the warp of a loom. In one well-studied letter (TC 3, 17), a weaver in Aššur is instructed on how to weave and finish textiles for sale in Anatolia. One requirement of these textiles is that “the warp should be dense,”³² which probably refers to a high number of warp threads per unit of measurement.³³ Soft wool, on the other hand, was often preferred for the weft in antiquity, and an Old Assyrian text mentions “30 minas of soft wool for the weft.”³⁴ The two most common types, ‘soft’ and ‘long’, thus probably refer to wool that was intended for weft and warp threads, respectively.

In addition to these descriptive terms, we have a handful of colour designations: red (*sāmu*, CAD S, 11’ b, 129–130), white (*paši’um*, CAD P, *pešû*, 1c, 330),³⁵ dyed (*šinītu*, CAD Š3, A1b, 47) and again red (*makrūm*, CAD M, b, 138).³⁶ The CAD translates *sāmu* specifically as ‘red-dyed’, rather than just ‘red’ (note Landsberger 1967, 140: *sāmu* = rot-braun). However, the large quantities of *sāmu* wool recorded in the texts, e.g. the 20 talents (c. 600 kg) mentioned in CCT 4, 47a, makes dyeing unlikely. The amount of dyestuffs needed to dye such a quantity of wool would be substantial, and most likely prohibitively expensive.³⁷ Instead, it suggests that *sāmu* also refers to a natural reddish-brown wool colour.³⁸ The same argument can be made for the colour white (*paši’um*), which appears in even larger quantities than red in the Old Assyrian documentation. In CCT 4, 47a, 80 talents (some 2.4 tons) of white wool are mentioned, which again indicates that the colour is natural rather than artificial.

In comparison, wool in the colour *makrūm* – also red of some kind – occurs only in volumes of between 10 and 20 minas (c. 5 and 10 kg), and so this term could refer to the dyed variety of red wool (e.g. OIP 27, 6 and 46b). However, the term is attested too rarely in the Old Assyrian texts to allow any firm conclusions, and when it occurs in other text corpora, the nuance is used to refer to moles and the planet Mars (CAD M, 138).³⁹ Michel and Veenhof recently translated it as ‘reddish’.⁴⁰

The final term for coloured wool found in the Old Assyrian records is *šinītu*, ‘dyed’. It does not refer to a particular colour, but is rather a reference to the fact that the wool or textile has been “soaked” in liquid (CAD Š1, *šanû* C, 408).⁴¹

The group of descriptive terms appearing in the Old Assyrian texts suggest that the merchants did not always buy raw wool but sometimes acquired it when it had been processed to a certain degree, perhaps in village households, or by professional craftspeople (e.g. fullers) in the towns. A number of different types, colours, and qualities were available on the market, and the prices of processed wool varied significantly, but always exceeded the price of unspecified, i.e. probably unprocessed wool.

Direct archaeological evidence for wool in Middle Bronze Age Anatolia is scant. Textile imprints have been found on the reverse of clay *bullae* and cuneiform tablets from Kültepe, but no systematic analysis of such imprints has yet been undertaken. There are only very few actual textile finds from the period, the most interesting one coming from the site of Acemhöyük (see Fig. 14.2),⁴² in a level contemporary with the Old Assyrian settlement at Kültepe, and in a room that also contained a number of ivories.



Figure 14.2. Textile found at Acemhöyük. Photo from Sözen 2000, 166.

Nimet Özgüç writes that the piece was “found scattered on the floor in small fragments, the textile resembled a white linen. On one side it has a decoration of dark and light blue faience beads sewn on with gold thread”.⁴³ Textile historian E. Barber notes in her own observations on the fragment that: “one can still make out a pattern of stacked chevrons and part of a swastika or meander”.⁴⁴ The excavator’s idea that the fragments were made of flax fibre has never been tested, and if the textile were, as she asserts, an Assyrian import, then it would in all likelihood have been made from wool.

But the blue faience rings that are attached to the cloth are an unexpected find in an Old Assyrian context, and it seems unlikely that this type of textile was commonly in circulation in Anatolia. Rather, the use of blue faience and the gold thread are more evocative of Egyptian textile work, e.g. the patterned faience collars.⁴⁵ In fact, the fragment was discovered alongside Egyptian or Levantine-inspired ivories,⁴⁶ which could again point to a more western point of origin.

In 2001, Aliye Öztan and her team from Ankara University excavated a room in a building dated to the Old Assyrian-period at Acemhöyük, which contained 21 cone-shaped loom-weights found *in situ*. Some of these were lying close to each other, and the whole group was located on the floor near a bench.⁴⁷ In the same layer the excavations also uncovered four spindle whorls and an awl.⁴⁸ Although no wooden beams were preserved, the setup is suggestive of the remains of a warp-weighted loom, and the excavators have dubbed the room ‘dokuma evi’, the ‘weaving house’.

Loom weights have also been uncovered in the private houses of the lower town at Kültepe, and both pyramidal and crescent shaped weights were found in the first two seasons of excavation there, some of them coming from the house of the Assyrian merchant named Adad-şululi.⁴⁹ Adad-şululi’s sister Hududu is known to

have lived in Aššur, and sent textiles to her brother in Kaneš. He also had a wife living in Aššur.⁵⁰ But whether he had a secondary local wife (*amtum*) with him in Anatolia is not known. Yet, since the warp-weighted loom, which uses loom weights to keep the warp threads taut, is a technology mostly unknown in Mesopotamia during the Middle Bronze Age,⁵¹ it seems likely that a local Anatolian, rather than an Assyrian, did the weaving in Adad-šululi's house.

The Assyrian merchants in Anatolia not only traded in imported tin and textiles, and local copper and wool, but also bought and sold textiles produced in Anatolia – some of them made in their own private homes.⁵² The most common type of Anatolian textile was the *pirikannum* or *parakunnum*. Like the imported textiles, *pirikannus* came in different qualities, such as 'good',⁵³ 'extra good',⁵⁴ and 'soft'.⁵⁵ They could also be 'large',⁵⁶ 'red',⁵⁷ and 'strong enough to be used for clothing'.⁵⁸ *Pirikannus* were apparently often used for clothing, but whenever it is specified who wore them, they occur only in the context of servants or slaves.⁵⁹ *Pirikannus* appear to have been produced mainly in Kaneš and the Anatolian city-states located south and east of Kaneš.⁶⁰

Tax was paid on *pirikannus*, just as on the textiles imported from Aššur. A passage in a commercial treaty between the Assyrian merchant colony and the state of Kaneš reads: "From every 10 *parakannum*-textiles you will take 1 *parakannum*-textile (as) your excise-tax. If the textile is taken in the city-gate, the textile will cost a fixed price".⁶¹ Note, however, that according to this treaty, the excise-tax on the locally produced *parakannum* was 10% as opposed to the usual rate for imported textiles of 5%.⁶²

As I have argued elsewhere,⁶³ the textual record documents a household-based production of *pirikannus* by both Anatolian and Assyrian women living in Anatolia. Some of this production was meant for domestic consumption, and some was intended for sale. The trade in *pirikannus* appears to have been quite substantial, and quantities above 50 textiles in a single transaction are mentioned.⁶⁴

To conclude, wool appears often in the Old Assyrian textual records, and must have been of great importance as a trade commodity for the Assyrian merchants, and as a raw material for a domestic textile production. While the texts treat wool with a matter-of-factness that leaves little explanation about production and consumption, a number of conclusions can be inferred by the use of the adjectives to describe it. The wool was bought on markets in processed form, intended either for weft or warp as 'soft' or 'long' wool. It seems that the wool was rarely dyed before being sold, although it is attested. Alum, one of the most important dye fixatives or mordants in antiquity, is also remarkably absent in the texts from the period, while it is amply attested in the Mari documentation.⁶⁵

Contemporary archaeological material is limited, but striking. The find of fragments of textiles with blue faience rings from Acemhöyük could not have been predicted on the basis of the textual evidence, and the type of loom weights found in the Assyrian houses show that local technologies were practiced in Assyrian contexts. Archaeological textiles only rarely survive the Anatolian climate, but surprising details about ancient cloth can be extracted from the tools. Studies of Middle Bronze Age loom weights from Karahöyük, Konya indicate a varied production from fine to coarse cloth, and suggest the possibility of use of twill and patterned weaves (Lassen 2013; forthcoming). While such studies do not permit the equation of e.g., the local *pirikannum* with a particular type of textile, it does

provide some insights into the range of qualities and weaves that might have been in existence at the time.

Abbreviation

CNI Carsten Niebuhr Institute Publications

Bibliography

- Barber, E. J. W. (1992) *Prehistoric Textiles: the Development of Cloth in the Neolithic and Bronze Ages with Special Reference to the Aegean*. 3rd edn. Princeton.
- Bardet, G., Joannès, F., Lafont, B., Soubeyran, D. and Villard, P. (1984). *Archives Administratives de Mari I*. Archives Royales de Mari 23. Paris.
- Barjamovic, G. (2011) *A Historical Geography of Anatolia in the Old Assyrian Colony Period*. CNI Publications 38. Copenhagen.
- Barjamovic, G. (forthcoming a) Interlocking Exchange Systems and the Infrastructure of Trade in Western Asia c. 2000–1700 BC. In K. Kristiansen *et al.* (eds), *Trade and Civilization in the Pre-Modern World*. Cambridge.
- Barjamovic, G. (forthcoming b) Anatolia Before the Hittite State. In L. Ullmann and M. Weeden (eds), *The Geography and Landscape of the Hittites*. Leiden.
- Barjamovic, G., Hertel, T. and Larsen, M. T. (2012) *Ups and Downs at Kanesh: Chronology, History and Society in the Old Assyrian Period*. Publications de l'Institut historique-archéologique néerlandais de Stamboul 120. Leiden.
- Dercksen, J. G. (1996) *The Old Assyrian Copper Trade in Anatolia*. Publications de l'Institut historique-archéologique néerlandais de Stamboul 75. Leiden.
- Dercksen, J. G. (2004) *Old Assyrian Institutions*. MOS Studies 4. Leiden.
- Dercksen, J. G. (2008) Observations on Land Use and Agriculture in Kaneš. In C. Michel (ed.), *Old Assyrian Studies in Memory of Paul Garelli. Old Assyrian Archives, Studies, vol. 4*. Publication de l'Institut historique-archéologique néerlandais de Stamboul 112, 139–157. Leiden.
- Durand, J.-M. (1983) *Textes Administratifs des Salles 134 et 160 du Palais de Mari*. Archives Royales de Mari 21. Paris.
- Gelb, I. J. (1935) *Inscriptions from Alishar*. Oriental Institute Publications 27. Chicago.
- Gültekin, A. E. (2005) Çorum-Ortaköy Şapinuva Arkeolojik Alanından Ele Geçen Tekstil Örneği Analizi. In A. Süel (ed.), *V. Uluslararası Hititoloji Kongresi Bildirileri, Çorum 02–08 Eylül 2002*, 431–443. Ankara.
- Günbattı, C. (2004) Two Treaty Texts Found at Kültepe. In J. G. Dercksen (ed.), *Assyria and Beyond. Studies Presented to Mogens Trolle Larsen*. Publications de l'Institut historique-archéologique néerlandais de Stamboul 100, 249–268. Leiden.
- Landsberger, B. (1967) Über Farben im Sumerisch-Akkadischen. *Journal of Cuneiform Studies* 21, 139–173.
- Laroche, E. (1966) *Les noms des Hittites*. Paris.
- Larsen, M. T. (2010) *The Archive of the Šalim-Aššur Family. Vol. 1: The First Two Generations*. AKT VI-a. Ankara.
- Lassen, A. W. (2010a) Wool Trade in Old Assyrian Anatolia, *Jaarbericht Ex Oriente Lux* 42, 159–179.
- Lassen, A. W. (2010b) Tools, Procedures and Professions. A Review of the Akkadian Textile Terminology. In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the 3rd to 1st millennium BC in the Ancient Near East and Eastern Mediterranean*. Ancient Textiles Series 8, 270–280. Oxford.
- Lassen, A. W. (2013) Technology and Palace Economy in Middle Bronze Age Anatolia: The Case of the Crescent Shaped Loom Weight. In M.-L. Nosch, H. Koefoed and E. Andersson-Strand (eds), *Textile Production and Consumption in the Ancient Near East: Archaeology, Iconography, Epigraphy*. Ancient Textiles Series 12, 78–92. Oxford.
- Lassen, A. W. (forthcoming) Weaving with Crescent Shaped Loom Weights. An Investigation of a Special Kind of Loom Weight. In E. Andersson-Strand and M.-L. Nosch (eds), *Tools, Textiles and Contexts*. Ancient Textiles Series. Oxford.

- Michel, C. (1997) 'À table avec les marchands paléo-assyriens.' In H. Waetzoldt and H. Hauptmann (eds), *Assyrien im Wandel der Zeiten. XXXIXe Rencontre Assyriologique Internationale, Heidelberg, 6–10 Juli 1992*. Heidelberger Studien zum Alten Orient 6, 95–113. Heidelberg.
- Michel, C. (2003) *Old Assyrian Bibliography of Cuneiform Texts, Bullae, Seals and the Results of the Excavations at Aššur, Kültepe/Kanish, Acemhöyük, Alisar and Bogazköy*. Publications de l'Institut historique-archéologique néerlandais de Stamboul 97. Leiden.
- Michel, C. (2005–2006) Old Assyrian Bibliography 1. *Archiv für Orientforschung* 51, 436–449.
- Michel, C. (2006) Femmes et production textile à Aššur au début IIe millénaire av J.-C. *Techniques and Culture* 47, 285–301.
- Michel, C. and Veenhof, K. R. (2010) The Textiles Traded by the Assyrians in Anatolia (19th–18th Centuries BC). In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 210–271. Ancient Textiles Series 8. Oxford.
- Nosch, M.-L. (2004) Red Coloured Textiles in the Linear B Inscriptions. In L. Cleland and K. Stears (eds), *Colour in the Ancient Mediterranean World*. British Archaeological Report S1267, 32–39. Oxford.
- Özgüç, N. (1966) Excavations at Acemhöyük. *Anadolu / Anatolia* 10, 29–52, pls XIV–XVIII.
- Özgüç, T. (1950) *Ausgrabungen im Kültepe 1948/Türk Tarih Kurumu Tarafından Yapılan Kültepe Kazısı Raporu 1948*. Türk Tarih Kurumu Yayınları V/10. Ankara.
- Öztan, A. (2003) 2001 Yılı Acemhöyük Kazıları. *Kazı Sonuçları Toplantısı* 24:1, 39–48.
- Sözen, M. (ed.) (2000) *Cappadocia*. 2nd edn. Istanbul.
- Ulshöfer, A. M. (1995) *Die altassyrischen Privaturkunden*. Freiburger altorientalische Studien. Beihefte: Altassyrische Texte und Untersuchungen 4. Stuttgart.
- Veenhof, K. R. (1972) *Aspects of Old Assyrian Trade and Its Terminology*. Studia et documenta ad jura Orientis antiqui pertinentia 10. Leiden.
- Veenhof, K. R. (2003) *The Old Assyrian List of Year Eponyms from Karum Kanish, and its Chronological Implications*. Türk Tarih Kurumu Yayınları VI:64. Ankara.
- Veenhof, K. R. (2008) Mesopotamia: The Old Assyrian Period. In K. R. Veenhof and J. Eidem (eds), *Orbis Biblicus et Orientalis, 160–165*. Fribourg and Göttingen.
- Waetzoldt, H. (1972) *Untersuchungen zur neusumerischen Textilindustrie*. Studi economici e tecnologici 1. Roma.
- Wilkinson, A. (1971) *Ancient Egyptian Jewellery*. London.

1 Barjamovic forthcoming a, with further references.

2 Dercksen 1996; Dercksen 2004, 181–190; Lassen 2010a; Barjamovic 2011.

3 For the use of professional titles, see Veenhof 2003, 25–27. An individual named Garasunua (Hittite or Luwian) appears as *ša šaptim* in the witness list, TC 1, 99:15–16 (Laroche 1966, 87). Hapu-aššu (Happuwassu, Hittite, see Laroche 1966, 60, 285) in Kt 91/k 348:32, also *ša šaptim*.

4 Barjamovic forthcoming b.

5 Lassen 2010a.

6 Dercksen 1996.

7 Barjamovic 2011.

8 For a discussion, see Lassen 2010a, 171–174.

9 Lassen 2010a, 172.

10 Larsen 2010; Lassen 2010a, 175–176.

11 Kt 87/k 464:18–20 (courtesy K. H. Hecker).

12 Cf. CCT 4, 47a:30–33

13 Kt f/k 49:5–8 (courtesy L. Umur, CAD vol. B p. 97b).

14 Veenhof 2008, 223.

15 Veenhof 2008, 220.

16 AKT 6, 151:33

17 Cf. Ulshöfer 1995, Nos 309, 314, 324, and 334.

18 KTB 13:3–6, 1 UDU a-na A-šūr, 1 UDU a-na Be-lim 1 UDU a-na i-li-ni ni-na-ql.

19 BIN 4, 157. The price of a sheep varies from a little less than a shekel to 3–4 shekels of silver (Michel 2006, 291).

20 Michel 1997, 108–109; Dercksen 2008, 152–153.

21 Michel 1997, 109.

22 CCT 5, 32a: 13–15.

- 23 For an identification of 'Akkadian' with Southern Mesopotamia, cf. Michel and Veenhof 2010, 221–222.
- 24 Michel suggests the same about the *šuppum*-sheep (Michel 1997, 109).
- 25 See for example Ulshöfer 1995, Nos. 309, 314, 324, 334 (lists in all 3080 loaves of bread plus some sheep, oxen, beer and wine), 339, 340, 364, and 370.
- 26 Veenhof 2008, 53.
- 27 Barjamovic 2011, 11.
- 28 AKT 4, 43:7, SÍG.HI.A *na-ri-ib-tám*; AKT 4, 52:7–8, *ša-áp-tám na-ri-ib-tám* SIG₅^{tám}; Prag I 646:9', SÍG.HI.A *na-ar-ba-tim*.
- 29 Veenhof 1972, 191–202.
- 30 AKT 4, 55:20, *š[a]-áp-tim* SIG₅-tim, and TC 3, 65:18–21, *ša-áp-tám ša Ma-a-ma na-ri-ib-tám a-ra-ak-tám da-mi-iq-tám ú-ta-ar-tám*.
- 31 TC 3, 65:18–21, *ša-áp-tám ša Ma-a-ma na-ri-ib-tám a-ra-ak-tám da-mi-iq-tám ú-ta-ar-tám*.
- 32 TC 3, 17:14, *šu-tù-šu lu ma-da-at*.
- 33 Lassen 2010b, 274; Michel and Veenhof 2010, 251, 254.
- 34 Michel and Veenhof 2010, 214.
- 35 Red and white wool appear together in ritual contexts, e.g. "one white *lamhuššûm*-textile and one red *lamhuššûm*-textile" for Šamaš and Aya (CT 32, 4:xi 23), "you twist together red and white wool" (CT 23, 10:23) and "you spin a string of red and white wool" (AMT 88, 2:17). Translations from CAD S b2', 130, with further examples. This suggests that these colours were considered visually complementary.
- 36 For colours of Old Assyrian textiles, see Veenhof 1972, 186–189; Lassen 2010a; Michel and Veenhof 2010, and see Landsberger 1967 for colour of textiles and wool in Mesopotamia in general.
- 37 Nosch 2004, 35 concerning the Mycenaean colour term *pu-ru-wa*, 'natural red-brown'.
- 38 For red wool in the Ur III period, Waetzoldt differentiates between the Sumerian colour designations SI₄.A and HUŠ. A, the former being a natural red colouring of the wool, and the latter the red-dyed variety (Waetzoldt 1972, 51). Note also Landsberger 1967, 145).
- 39 The rarity and context of the term made Landsberger question a translation of plain 'red' (Landsberger 1967, 144, fn. 124). The meaning 'red' is suggested by its links with Arabic *mkr* 'to be red' (Gelb 1935, 28–29).
- 40 Michel and Veenhof 2010, 252.
- 41 Note also *šarpum* used of woolen fleeces (Lassen 2010a, 160–161), and *warqum* 'yellow/green' about textiles (Michel and Veenhof 2010, 252). In addition to these colour terms, also *ešu* or *ušu* (CAD W s.v. *wašu*) is found, the meaning of which is unknown.
- 42 N. Özgüç 1966, 47. Note also a fragment of textile, probably sacking, from Middle Bronze Age layers in Çorum (Gültekin 2005 (in Turkish)).
- 43 N. Özgüç 1966, 47.
- 44 Barber 1992, 171.
- 45 Wilkinson 1971, pl. XXVII a.
- 46 N. Özgüç 1966, 43–45.
- 47 Öztan 2003, 41, fig. 4.
- 48 Öztan 2003, 41.
- 49 T. Özgüç 1950, 208.
- 50 Dercksen 1996, 96.
- 51 Barber 1992, 92, 249–254.
- 52 Lassen 2010a, 164–166.
- 53 TC I, 43: 14–16.
- 54 Kt 94/k 364: 15–16 (courtesy G. Barjamovic).
- 55 Kt n/k 1385: 15–16. Note also Kt 94/k 1675 AKT 6, 544: 21–22: *pì-ri-kà-ni na-ar-bu-tim wa-as-mu-tim*.
- 56 TC 1, 43: 14–16.
- 57 BIN 4, 162:3–4; TC 1, 43:24.
- 58 BIN 4, 78:9–10.
- 59 BIN 4, 78:6–7; BIN 4, 162:1–2; AKT 6, 1045:5–6.
- 60 Luhuzattiya: BIN 4, 162:31–33; Mamma: TC 1, 43:3–4; Kaneš: CCT 5, 12a:6–7; AKT 6, 478:6–7; Zalpa in AKT 6, 726:9–10.
- 61 Kt 00/k 6:69–72, cf. Günbatt 2004, 254.
- 62 Veenhof 1972, 85; Veenhof 2008, 212.
- 63 Lassen 2010a, 164–166.
- 64 Veenhof 1972, 125; Michel and Veenhof 2010, 238–239.
- 65 Durand 1983, 377; Bardet, *et al.* 1984, 142–143, 153–170.

15. Wool Economy in Minoan Crete before Linear B. A Minimalist Position

Pietro Militello

According to the original program, the goal of this conference was “to explore the origins and beginnings of wool economy ... and to reconstruct the stages leading up to large-scale textile manufacture in the economies of the various Near Eastern and Aegean states”. In this perspective, my contribution should address the situation in Minoan palatial Crete, a first generation secondary state, developed in the first half of the second millennium (cf. Table 15.1) at the border of the greater Near Eastern urban civilisations, and therefore largely influenced by them, but, nevertheless, also characterized by strong original features. Unfortunately, our knowledge of Minoan economy is very limited, especially regarding the period before the Mycenaean palaces. With respect to Egypt and the Near East, script appears comparatively late in Crete at the beginning of the 2nd millennium in two variants: Hieroglyphic and Linear A, both undeciphered. Moreover, documentary evidence is very limited in quantity and extent: in all 331 inscriptions in Hieroglyphic and round 1426 in Linear A, including tablets, sealings, seals, inscribed vases and other objects, all from one word to few written lines. Their chronology spans from MM I to MM II (Phaistos, Knossos), MM III (Mallia) to LM IB (Khanià, Hagia Triada, Zakros).

Based on these premises, the minimalist position of my title requires no further clarification. In order to fill the gap left by the lack of writing, however, I chose to widen my research to all sources of information, including other administrative evidence (seals and sealings, systems of weights), archaeological and zooarchaeological data and iconography. True woollen textiles are, unfortunately, not available since the only extant pieces preserved from Crete are made of vegetal fibres, as a consequence of the acidic Aegean soils.

I also chose to widen the field of research beyond the literate period from the 4th millennium to the end of the second palaces in Crete (and the arrival of the Mycenaeans), in 1450 BC.

Before starting the discussion, two considerations must be made. First, we would like to avoid a kind of evolutionary or teleological principle, according to which the Mycenaean model should be brought back automatically on the pre-existing economic system. Second, following an observation by Iris Tzachili (1997), we have also to keep in mind that the roles of wool and of woollen textiles could be different, since finished items, as fabrics, do not only represent the raw materials

from which they are made, but also labour, expertise and time, to the extent that they can be conceived as completely different objects to animal fibre.

Major Chronology		
EM I	2500-2300 BC	Early Minoan period (EM I–III, MM IA)
EM II	2300-2100 BC	Early Minoan period (EM I–III, MM IA)
EM III	2100-1900 BC	Early Minoan period (EM I–III, MM IA)
MM IA	1900-1800 BC	First palaces (Protopalatial period)
MM IB	1800-1700 BC	First palaces
MM II	1700-1600 BC	First palaces
MM III	1600-1500 BC	Second Palaces (Neopalatial period)
LM I	1500-1400 BC	Second Palaces
LM II	1400-1300 BC	Second Palaces
LM III	1300-1100 BC	Postpalatial phase

Table 15.1. Chronological chart of Aegean Neolithic and Bronze Age. EM, MM, LM = Early, Middle and Late Minoan. Absolute chronology from Manning 2010. Differences between a high chronology (e.g. Manning 2010) and a low, traditional chronology (e.g. Warren, Hankey 1989) regards mainly the subdivision of MM III–LM IB, and so are of small concern for our scopes.

Keeping these provisos in mind, in the following discussion we will try to answer the two questions posed by the workshop:

1. When was wool introduced to Crete?
2. What was the role of wool in the different phases of Minoan economy and society?

As far as the first question is concerned, a common opinion exists which,¹ following the theory of the ‘secondary products revolution’,² dates the introduction of wool on Crete to the beginning of the Bronze Age; afterwards, animal fibres became predominant because of the ecological features of the island which favoured the maintenance of large flocks.

The role of wool and textiles for the Minoan economy has instead been evaluated differently. The main interest of early 20th century scholars was towards history of art. As a consequence, Minoan production of elaborated woollen tapestry, curtains, hangings, rugs, carpets, and so on, whose existence was deduced from the variety of painted patterns in pottery and wall paintings, was considered mainly for its potential to explain the diffusion of Minoan or minoanizing ‘motifs’ in Egypt or Mesopotamia,³ and its economic role was left on the background. Later, the processual approach of the ‘70s and ‘80s, emphasizing the autonomous and indigenous development of civilisation in Crete, considered agriculture as the main component of Minoan economy.⁴ Analysis of Egyptian ceiling patterns as imitations of Minoan carpets⁵ did not affect the general economic interpretation, while architects, potters, wall painters and metal workers have mainly entered the discussion as items of exchange.⁶ In his latest book, however, Burke (2010) has considered textile production as one of the main economic resources of Crete, from the beginning influencing all the aspects of wool production: breeding, manufacturing and distribution. According to him, the number of sheep figurines in the so called Peak Sanctuaries reflects the great importance of sheep in Minoan economy and, from the end of the 3rd millennium, painted woollen textiles would have been the main export item of Crete. As a result, this craft became one of the principle concerns of the palatial administrations.

In order to understand the reasons behind this contrast in data and opinions, we will now begin a review of the different kinds of evidence.

1. Analysis of the data: the material evidence

Elsewhere⁷ we discussed the possibility of an earlier introduction of wool than previously thought: as early as the Middle or Late Neolithic period, when archaeological evidence for textile manufacture (spindle whorls and loom weights) begins appearing in Knossos (from 3750) and Phaistos (from 3500). From the available, sometimes contrasting data, we concluded that probably wool was already introduced at the end of the 4th millennium BC, used side by side with plant fibres, but without representing a revolution from either a technological nor a social point of view and only towards the middle of the 3rd millennium BC some elements seem to indicate an increasing importance of wool. Spindle whorls and loom weights, however, do not demonstrated *per se* if they were used for wool or for flax.

The first sure evidence for the use of wool is given by the introduction of dyeing installations⁸ which first appear in Myrtos, eastern Crete, in the EM IIB phase, i.e. around 2500–2400 BC, because dyeing is preferentially associated with wool rather than linen because linen is very difficult to dye. Here, tubs and channels were found in rooms 8, 59 and 81. In Room 59, analyses of the tub identified animal lipids, which could be consistent with an interpretation as a vessel used for wool-dyeing.⁹ Spindle whorls, loom weights, spindle stands and also the amount of sheep bones¹⁰ are the demonstration, affirming that in this period “a wool based economy was thriving”.¹¹ A few of centuries later the extraction of purple from murex snails (‘the invention of purple’),¹² was introduced in Crete, before all the other known purple working areas. In Petras, Sitias, more than 200 crushed murex shells were found in an MM I context (around 2000 BC);¹³ and from 1900 to 1700 large amount of murex shells are to be found in Kommos¹⁴, Kouphonisi and Palaikastro, and especially at Pefka, Pachia Ammos¹⁵. These are all sites of eastern Crete (with the exception of Kommos), all coast sites, all sites probably independent from palatial centres.

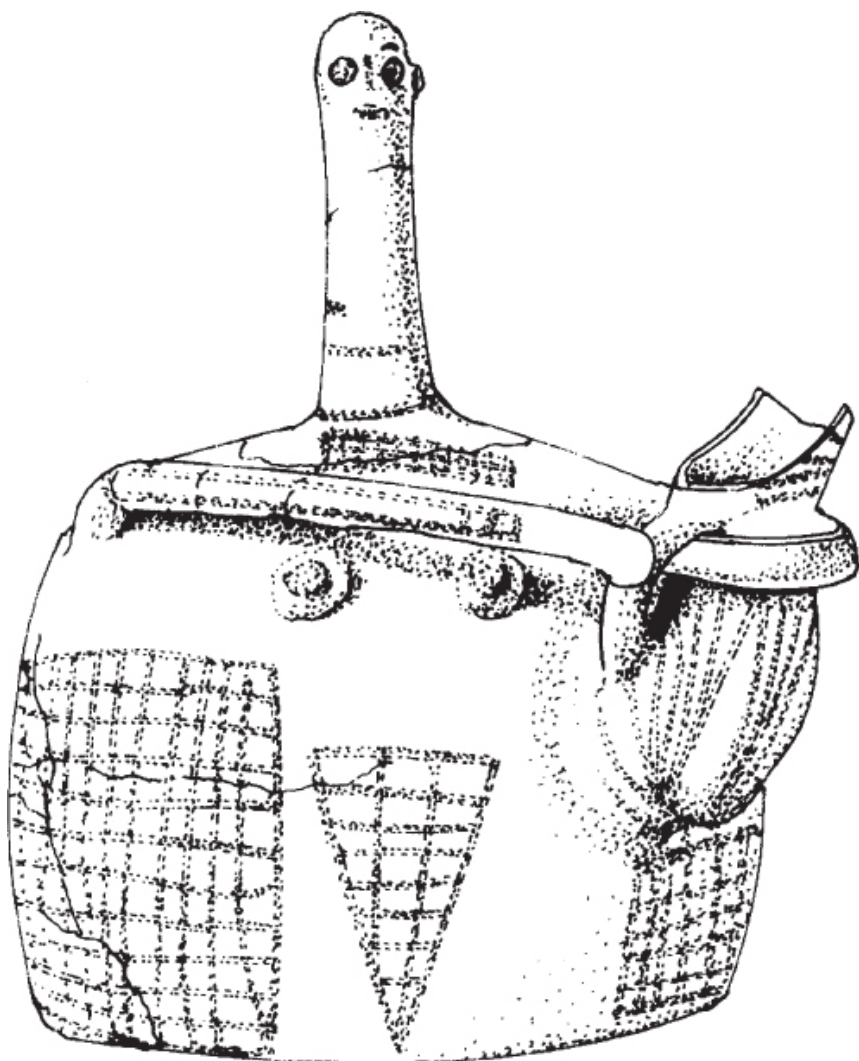


Figure 15.1. Figurine of a goddess from Myrtos (from Poursat 2008, fig. 83).



Figure 15.2. Figurine of a woman from Mallia (from Poursat 2008, fig. 84).



Figure 15.3. Figurine of a woman from Petsophas (from Marinatos, Hirmer fig. 15).

Almost contemporary with the Myrtos dyeing installations, a possible evidence for the economic importance of wool could be represented, in the Cyclades, by a 700 g marble disc from Ayia Irini, interpreted as a balance weight. Balance weights based on a unit of 8.3 grams system are known from Tiryns in this

period,¹⁶ but in the case of Ayia Irini the weight value could hint at an ancestor of the unit 'zeta', a special unit for wool,¹⁷ demonstrating that as early as the end of the EBA (2400–2300 BC), wool was weighed and traded around the Mediterranean. It is significant, however, that such evidence is not present in Crete, and comes from areas directly linked to the Near East suggesting that, if this was the case, trade of wool was directed from the East.

Also in the field of iconography a change can be detected at the end of the Early Minoan period, when the first figurine with painted patterns appears. In fact, Neolithic figurines, especially of women, focus rarely on dress,¹⁸ and later EBA figurines are generally naked. The Goddess of Myrtos, dated to EM IIB, is the earliest figurine with painted patterns which could represent a dress (but physical features or simply decoration cannot be excluded). It is perhaps not a coincidence that this image comes from the same site and the same period where the first dyeing installation, already mentioned, was found. If the example from Myrtos (Fig. 15.1) can be doubtful, the figurines from Mallia (EM III, Fig. 15.2) and from Petsophas (Fig. 15.3), of the beginning of the Middle Minoan period (round 2100–2000 BC) indisputably show patterned dress. This is the beginning of what Barber labels the Classical Minoan Style in dress lasting until the beginning of the Mycenaean period. The rich decoration of this 'style' seems not to be possible without the use of wool as the main raw material, because it presupposes the use of a coloured thread which could not have been produced with linen.

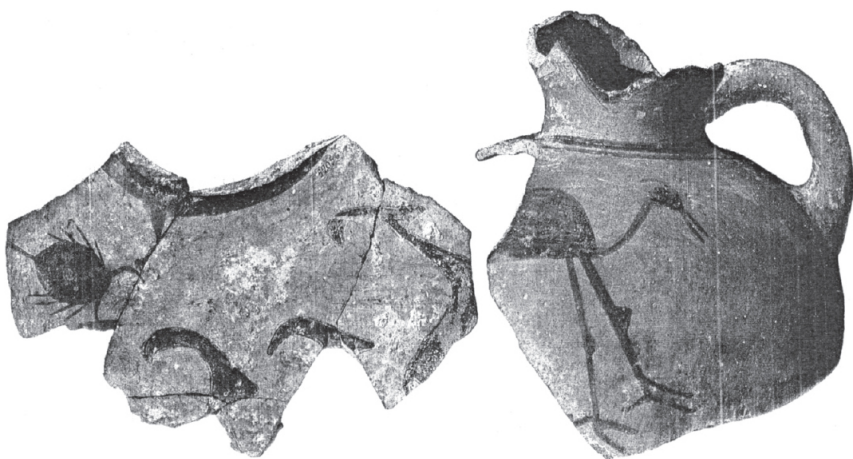


Figure 15.4. Fragment of vase with goat representations (from Evans 1921).



Figure 15.5. Bowls from Palaikastro with a flock (from Bosanquet, Dawkins 1923).

A roughly similar indication can be gained by the iconography of sheep and goats. Very few animal figurines are known from the Neolithic period. In the Minoan period bovines (bulls and cows) are the most represented animals, followed by caprids,¹⁹ but often as representations of the wild Cretan goat, the *agrimi* and not of the domestic goat, *Ovis capra*. The first certain goat representation, instead, is painted on a vase from Knossos, dated to MM IA (2000–1900 BC, Fig. 15.4). In the same period, the famous model on a vase from Palaikastro, was made, representing a herder with around 160 preserved animals,

originally summing up to 200 (Fig. 15.5).²⁰ The main problem is the identification of these animals. Bosanquet and Evans considered them bulls, but Dawkins later described them as “tiny sheep or even oxen”, suggesting that “the pattern on the outside of the bowl, with its appearance of weaving, is intended to represent the fence of the sheepfold”.²¹ In fact, the interpretation as cattle seems improbable. Even in contemporary Crete, a herd of 200 oxen is very rare. The main choice is between goats and sheep, and the schematic rendering of their body does not allow a precise interpretation. The document is important insofar as it could represent a large flock, of the kind known from later Linear B texts, whose use cannot be simply oriented towards meat, but presupposes an exchange strategy able to balance the intensive labour required for such a huge herd, probably based upon wool production.



Figure 15.6. Seals with goat and sheep representations (from Yule 1980).

Afterwards, the first clearly recognizable representations in bidimensional media are assigned to the very end of the Proto-palatial period or the beginning of the Neo-palatial period, and appear in seals representing a ram (Fig. 15.6).²² In the successive period, sheep and goats disappear from the “official” sphere iconography.²³

A special mention is deserved, instead, for the continuous tradition of the representation of ovides and caprids in the field of popular art, in the figurines *ex voto* dedicated in the Minoan peak sanctuaries, sacred areas on top of hills and mountains, from the beginning of the Middle Minoan period to the Late Minoan III. This is one of Burke’s main arguments for demonstrating the importance of sheep breeding in Minoan Crete, but the data are not so cogent: male and animal figurines are the most important kind of *ex voto*, but among animals, bulls represent much more than half and probably as much as 65% of the material, while sheep are more like 20% (Kyriakidis, pers. comm.). Partial data for bronze figurines show a similar pattern (Table 15.2).²⁴ This could reflect either a real preponderance of peasantry in comparison to herders, or a greater importance of cows in comparison to sheep. In any case, the figurines from Peak sanctuaries are not *per se* proof of a large importance of wool exploitation, even if, as we shall see, they can reflect a special role of Eastern Crete in this field.

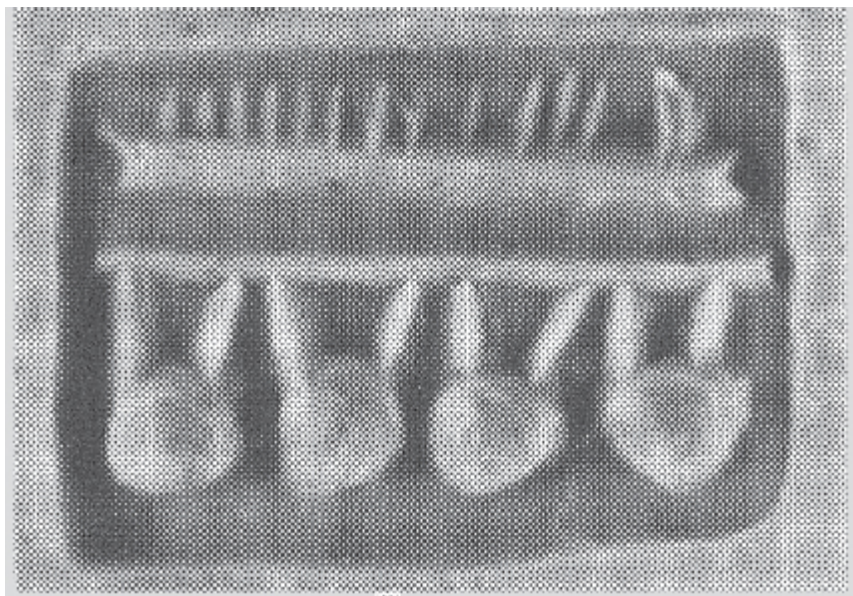


Figure 15.7. Seal with the motif of 'hanging vases' or 'loom weights' (CMS II, 2,151).

Finally, another piece of iconographic evidence related to textile activity should be mentioned. It is constituted by a group of seals produced in Mallia at the end of the first palace period (c. 1700 BC) representing, according to Burke, an abbreviated motif for the vertical loom (Fig. 15.7).²⁵ I have discussed this motif elsewhere,²⁶ and here I limit myself to affirm that only some of these representations can refer to looms, while the other have to be explained in another way.

	Sheep	Cattle	Other animals
Traostalos Heraklaion Museum without provenance	80	28	57
Haghios Nikolaos	0	0	4
Petsophas	n.d.	0	0
Piskokephalo	1	0	37
Plagia Siteia	n.d.	n.d.	0
Thylakas	0	n.d.	0
Oxykephalo (H. Nikolaos)	0	4	5
Etiani Kephala	0	16	14
Kalamaki	0	7	40
Vikla (Zakros)	0	7	10
Modi	0	67	113
Prinias	0	95	137
Pyrgos (Tylissos)	0	23	20
Giouchtas	n.d.	n.d.	0
Kalo Choriò (Mazas) MM I	0	14	n.d.
Karphi (TM III)	n.d.	predominant	n.d.
Prophitis Elias Mallia	0	0	0
Kophinas	12	26	n.d.
Philiorimos (Malevizi)	plastic vase	0	0
Vrysinas (Rethymno)	0	hundreds	n.d.
Chanià	0	82	70
Ho caravellas (Agkousealiana)	0	55	1
Syme Viannou (TM III)	0	predominant	0
	93	424	508
Total	1025		

Table 15.2. Sheep, cattle and. other animal bronze figurines from Minoan Peak Sanctuaries (source: Pilali Papasteriou 1985, 147–151).

2. The analysis of the data: the administrative evidence

The rise of Minoan ‘palaces’ or ‘court-centred buildings’, at the beginning of the 2nd millennium BC indicates the transition to early states roughly comparable with the early States of earlier Mesopotamia. Important changes in the cognitive fields appear, as the appearance of two scripts, the development of means of control through sealings and the introduction of a standard weight system. This process (rise of the ‘palaces’ and the appearance of administrative tools), however, is no longer considered as a sudden and unitary ‘revolution’ but a long development with different regional trajectories.²⁷

The first weight on Crete appears in Mallia in MM II; in the following two centuries weights, mainly of discoid shape and sometimes with incised signs, become abundant all over Crete. Studies by Petruso and Parise proposed a reconstruction of at least three weight systems, among which are specific sets of weights for wool²⁸ and textiles. The wool unit was around 3 kg, equalling the wool produced by 4 animals (700 g), as was used in Alalakh and Nuzi, and the unit for textiles was 6 times that of wool, which is equivalent to 18 kg. This system is however attested only in the Neo-palatial period, so that instead of a Minoan system, it has been labelled a ‘Neo-palatial system’.²⁹

Controlling devices through sealings (i.e. system of controls through sealings) already appear isolated in the late Pre-palatial period,³⁰ but their full development

occurred in the Middle Minoan period, influenced by Near Eastern practices as the deposit of *cretulae* from Phaistos ('archive' under Room 25) demonstrates, and continue in the Neo-palatial period.³¹ They do not bear a direct relationship with the topic under discussion, with the few exceptions of inscribed roundels considered in the following paragraph. Seal impressions are to be found, however, also on loom weights found in official buildings and private houses,³² demonstrating that an interest in the control of production surely existed.

The 'appearance' of writing is instead chronologically uncertain. Two scripts were used from the beginning of MM, hieroglyph (H) and Linear A (LA),³³ but securely dated tablets appear in MM I and, especially, in MM II, in the 'archive' of Phaistos (LA) (quoted above) and Mallia, Quartier Mu (H), then in MM III in the palaces of Mallia (H/LA) and Knossos (H), Petras, finally in LM I, only in LA, in many sites in Crete and in the Cyclades, with the major deposits being in Chanià, Zakros and, especially, Haghia Triada.

2.1. *Sheep, wool and cloth in texts*

Unfortunately for us, Minoan 'archives' in hieroglyphic and Linear A scripts are mainly focused on the production and redistribution of agricultural products (grain, barley, oil and wine), and the management of personnel. Craft production, such as wool and textiles, is instead underrepresented, and references to animal breeding are far from commonplace.³⁴

2.2. *Animals*

The ideogram for sheep is actually unknown in hieroglyphic script,³⁵ but it has been identified in Linear A in part due to the similarities with the Linear B ideograms OVIS AB 21 (sheep) and AB 22 (goats), and their ligatures A512–513, A575–576 (Fig. 15.8). We can distinguish between male, female and neuter. In all, only 9 documents deal with sheep, and 6 with goats.³⁶ The documents can be divided into two groups: the first one describes only a few animals, sometimes of different species (all the roundels and HT 20, 64, PH 31; ZA 9, 26Wc) while the second group registers larger quantities: 27 female sheep in HT 132, 30 female sheep in HT 136, 100 in ZA 22. We interpreted the first group as referring to the consumption of animals for feasts,³⁷ and the second group as referring to the management of modestly sized flocks.

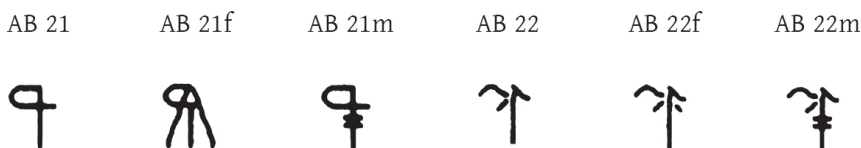


Figure 15.8. Linear A signs for sheep (AB 21) and goats (AB 22) and their variants.

2.3. *Wool*

Again in the case of wool, homography with Linear B allowed the cautious interpretation as wool of ligature AB80 + AB26 (= A559, with variants A558, 560), similar to Linear B *145 LANA (Fig. 15.9a).³⁸ In Linear A, it appears in ligature with AB 08 A (A557) and AB80 MA (A563), and juxtaposed to signs AB67 *ki*, AB13 *me*, AB27 *re*. Moreover, at least in one case (HT 20), the ideogram for sheep is followed by a fraction, and Schoep suggests that in this case it can mean

the skin or the hair of the goat.³⁹

The ideograms for wool occur in very few documents: one tablet from Phaistos (PH 3), two from Haghia Triada (HT 16, 24) and one from Khanià (KH 43) – unfortunately very fragmentary. Outside Crete it occurs on THE 8, ligatured with AB09 se, and perhaps TH Zg 5.⁴⁰

The tablet from Phaistos dates to an intermediate phase between the first and second palace, to MM III (1650 c.).⁴¹ On one of its sides, the sign AB80 is repeated, ligatured with other signs, and followed by numerals and fractions. In our opinion, all the ideograms represented in this text refer to wool, distinguished by its quality (e.g., by its colour).

If we assume that the unit for measuring wool is 3 kg and apply the values proposed by Bennett to the fractions, we obtain a total of 10.5 kg of wool of different qualities (12 kg if we accept Palaima's suggestion).⁴² A modest quantity which could have been used to produce one or two pieces of cloth if we accept the ratio of wool to pieces of cloth proposed for Linear B.

Certainly, this reading depends upon the interpretation of AB 80 MA as an abbreviated form for the ligature indicating wool. The same interpretation, however, has been put forward for a sherd from Akrotiri (THE Zg 5), where AB80 MA has been followed by 40 units (= 120 kg of wool) and by a list of single signs followed by numbers, interpreted as indicating types of cloth.⁴³

If this hypothesis is correct, large quantities of wool are present at Akrotiri, but they are also present at Ayia Triada, in two tablets from the Neo-palatial period.

In HT 12, the ideogram for wool appears among different products (grain, barley, figs) and is followed by AB 118 (TALENTUM) and the numeral 5, which would mean 150 kg of wool, if we accept LB values. What the relation is between wool and crops is not easy to say. The other commodities could be an accompanying payment for processing the received wool into textiles or all the items could be a payment for something, as in tablet from Pylos An 35, where wool, sheep, wine, figs and garments are paid for alum.

According to a reconstruction of the text proposed by Palaima and Hallager, a similar quantity is attested in a second tablet, HT 24, one of the most interesting documents for our problem. It was found near the southern entrance, in the vicinity of Room 27, where 45 *noduli* (sing. *nodulus*) were found on the sill of the window of the Corridor. *Noduli* are mini-documents, a kind of token interpreted as a receipt. All of the 45 *noduli* were impressed by the same seal.

The text is fragmentary, and registers wool on side A and ligatures followed by Talentum on Side B. Following a suggestion by Palaima, Hallager⁴⁴ proposed that Side A and B should represent the same commodity (wool) and the same quantity and reconstructed the original amount of 45 units of wool (135 kg), i.e. 4.5 talents. In this way he creates a link between HT 24 and the 45 *noduli*. The tablet should represent the written version of a transaction of wool between the Palace and some dependent personnel, who gave or received a receipt.

This very suggestive interpretation is not without problems. Del Freo⁴⁵ in his recent reexamination of the tablet, notes that the total amounts of side B are fractional, while dockets imply whole units; conversely he suggests that the tablet registers a deficit (AB67 KI) on side A, and the target quantity of wool to be manufactured on side B.

Del Freo's observations must be taken into serious consideration. It is however

difficult not to find a link between tablet, nodules and the large number of loom weights found in Room 27. In my opinion, the list on side B, constituted by ligatures and not by sign groups, refer probably not to people/places but to the quality of the wool or of the yarn, and is an assessment, while side A describes people obliged (KI-RO) to supply the raw material and their real contribution. The docket should be the receipts ready to be distributed for the absolved obligation. Fractions can be explained assuming that when actually delivering their contributions, some people were not fully accomplishing their obligation.

Two considerations must be made. The first: there is no evidence for spinning in the Villa, therefore wool should be already spun. The second: among the ligatures on side B, A539 (JA + KA) occurs, which is closely reminiscent of A554 (KA + A) on tablet HT 38. The alternation A/JA is also to be found in the Minoan libation formula (A-SA-SA-RA/JA-SA-SA-RA) and in both texts the ligatures mentioned are followed by AB 118 (TALENTUM) 1. Therefore, in our opinion, the possibility that they represent the same word cannot be excluded. Usually A554 has been interpreted as an agricultural product, but it could indicate instead a special kind of wool or thread.

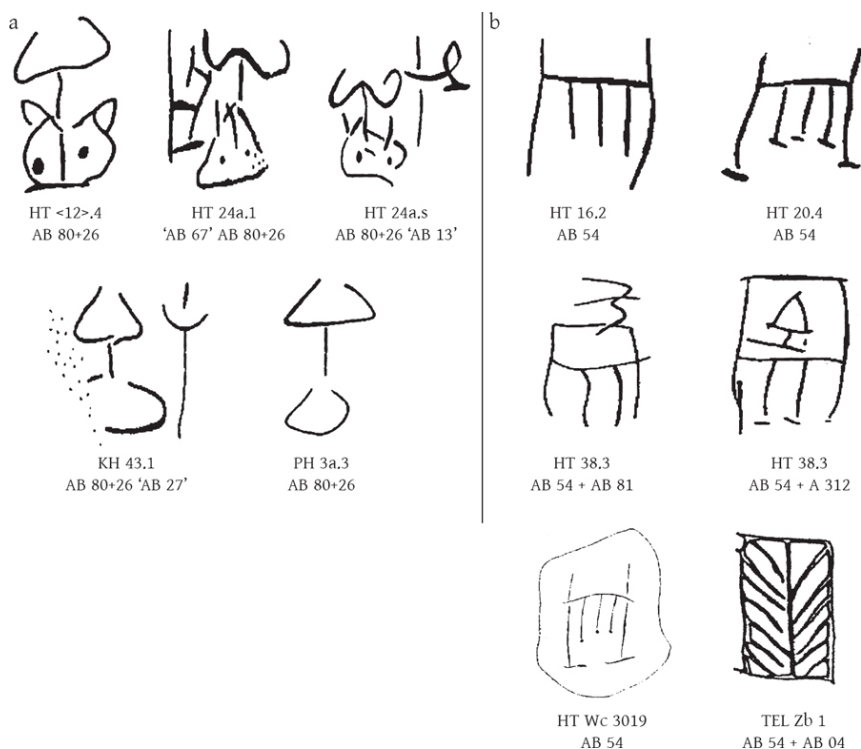


Figure 15.9a and b. Linear A signs for wool and cloths (from Nosch, Rougemont, Del Frio 2001).

2.4. Cloth

The ideograms for cloth are common to both Linear A and Linear B: AB54 and perhaps AB164 (TELA).⁴⁶ It occurs in ligature with AB70 *ku* (A535), A312 *zo*?

(A536), AB05 te.47 Two of these signs are also used in Linear B: TELA+te indicating the te-pa kind of textile, which we can now affirm is of Minoan origin,⁴⁸ and the TELA+zo ‘indicating either a belt or another kind of cloth of Minoan origin’ (Fig. 15.9b).⁴⁹ These ideograms recur in 4 documents from Hagia Triada (HT 16, 20, 38; HT Wc 3019), one from Akrotiri (THE 8), and one in a fragment from Tel Haror (TEL Zb 1).

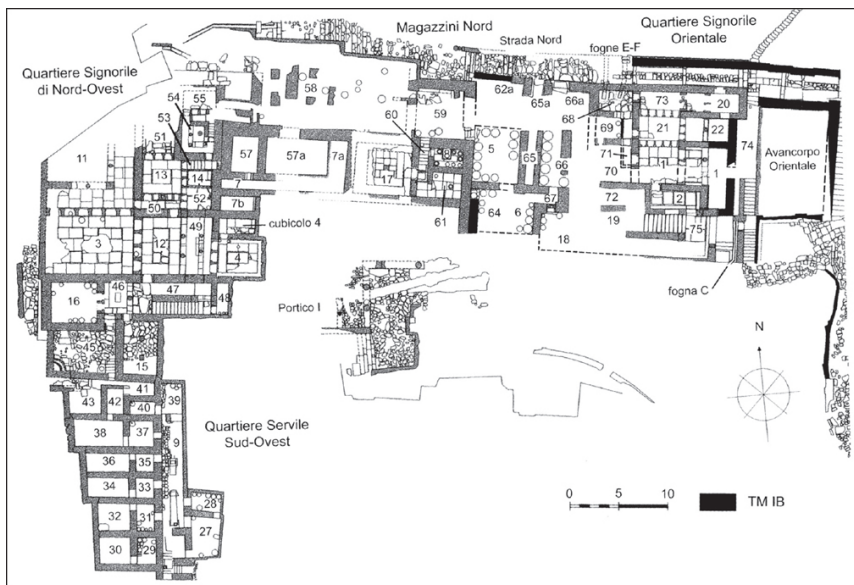


Figure 15.10. Plan of the southern quarter of Ayia Triada with indications of the findspots of HT 24 and of the noduli (from Militello 2012).

Tablet HT 38 has already been quoted. Only the lower half of the tablet is preserved, with a sequence of logograms including vase 1, pig 1, sheep 3, AKA 3 talents (90 kg), AB 54 (TELA) with AB70 *ku* (A535) and the other with A312 (TELA+zo?) (A536).⁵⁰ This miscellaneous content can be explained if it belonged to the ‘banqueting texts’, describing goods to be consumed in a banquet. In fact, clothes are present in the banquet text PY Un 2, and they were used as gifts in banquets in the cuneiform texts from Mari.⁵¹ HT 38 was found in the storerooms and mentions animals. A large amount of pig, oxen and sheep bones together with goat horns were found in both rooms 5 and 64 (Fig. 15.10).

AB54 occurs also in HT 16 and 20, two short parallel texts, with almost the same groups of signs followed by the same commodities. Only CAP and TELA are recognizable, and TELA is followed by a fraction. The general interpretation of the text, which is a list of miscellaneous items, is difficult. It is interesting, however, that cloth is mentioned followed by fractions. We should conclude that the unit of cloth, in Minoan administration, represented perhaps a standard item, of which only fractions could be woven, or that a larger cloth was cut into minor strips. AB 54 appears also in one roundel, Wc 3019. Along the border three seal impressions are impressed, one overwritten by fraction 704. Roundels are small discoid objects

representing a type of contract involving two people, one impressing his seals along the border, and the other one inscribing one or two sides with one sign, one ideogram or true 'words'. It seems probable that the number of seal impressions along the border indicates the quantity of the commodity implied by the inscription, and, in fact, when numbers are also inscribed, they coincide with the number of seal impressions. When a fractional sign is inscribed over the seal this would mean, according the reconstruction of Weingarten and Perna, that a 'missing amount' is present.



Figure 15.11. Loom weight with incised sign AB07 (from Militello 2012).

Finally, two discoid loom weights come from Ayia Triada and have the AB07 'TE' sign incised on (Fig. 15.11). This sign has a special significance in Linear A: found alone, it is the most used 'transaction sign' and it is used found in ligature with TELA, it is the TELA+TE type of cloth occurring in both Linear A and Linear B. In both cases, its presence on a loom weight could have a special significance and suggests a special interest of Minoan administration for wool manufacture.

*

At the end of our discussion, we will try to answer our two questions against the background of the revised evidence.

As far as the introduction of wool is concerned, we have perhaps to abandon the idea of a 'revolution'. We have to accept, instead, the idea that the new material

appeared at an earlier stage, in the Neolithic, perhaps acquiring a special symbolic value, at the end of the 4th millennium BC, but its full potential was acquired slowly. The first step, after its introduction, should be the exploitation of the possibility of obtaining dyed garments. This happened in the second half of the 3rd millennium and, especially, at the beginning of the second one with the introduction of purple. Colours gave the Minoan textiles the possibility of exploring the full scope of patterns, spirals, even figural representations, influencing pottery decoration and creating in the Neo-palatial period, fabrics as complex as Gobelins embroidery in Modern Europe, according to Barber.

As far as the economic role of wool is concerned, some evidence appears for a greater economic importance of some sites, especially in Eastern Crete, for the pre-palatial period, but this does not seem to be a generalized phenomenon. For the 2nd millennium, instead, we would expect that textile manufacture was one of the major concerns of Minoan palaces, and this idea is reinforced by the continuity between wool ideograms and wool weight units of Linear A into Linear B, but as we saw, the evidence for production and distribution of wool in Minoan archives is not abundant and sometimes disappointing.

On one hand, wool and cloth, together with pottery and bronze, are among the few commodities quoted in hieroglyphic and Linear A texts, beyond agricultural commodities. Moreover, part of the manufacturing process was surely of interest for Minoan administration, as demonstrated by tablets and roundels concerning the acquisition and distribution of wool (PH 3, HT24, HT Wc3019), sometimes in large quantities (THE 8?), or by the groups of loom weights found within the palaces and villas, sometimes impressed or inscribed. After being woven, manufactured items were registered in connection with payments (?), feastings or religious activities. We are not able to understand if the cloth was made from linen or wool, but the absence of flax ideograms of tablets could be a further indication that written administration was interested in wool products only and the introduction of a wool-weighing system points surely in this direction.

On the other hand, in comparison to the later Linear B texts, the quantity of wool is poor, there are fewer textiles and the management of flocks, if existing, is underrepresented and does not seem in direct proportion to wool production. The raw material, in other words, could have been simply acquired by central places.

An explanation for this contrasting evidence has to be found, perhaps, in the nature of Minoan palaces. According to the new reading of the evidence by Driessen, Schoep, Hamilakis and others,⁵² Minoan palaces are no longer centres controlling all of the area of Crete and all spheres of economic activity. They appear instead as true Early States, based on parental structures, deeply rooted in the preceding social system, from which they slowly emerge. Negotiations and/or competition among different entities or factions should be a common phenomenon. In this perspective, it is clear that Minoan administrations (we have to use the plural) were not controlling all the aspects of Minoan economy, and large sectors of society were outside their concern. When studying vats and channels for the production of oil and wine, Kopaka and Platon noted that the few known examples from the palaces could never fill palatial storerooms: "Les palais se révèlent être en fait des fabricants modestes. Autrement dit, dans les magasins palatiaux n'étaient, en fait, stockées que des denrées qui y étaient entrées dans leur état fini".⁵³ As far as textiles are concerned, therefore, I suggested that Minoan

court centred buildings and, in LM I, Minoan villas, functioned differently from Mycenaean palaces, and were only interested in the later stages of the cycle of production, the weaving of special fabrics and the manufacture of beautiful cloth.⁵⁴ This would imply that the major part of productive cycle of wool occurred outside of the major centres, probably at household level, as a consequence disappearing from the evidence in our possession for the Proto- and Neo-palatial periods.

This does not contrast with the high complexity of Minoan garments: quality is not the equivalent of quantity, just the opposite is often true, and clothes used in the cult or in the ritual, could be the result of a lengthy manufacturing process by a few specialists. Nor it is in contrast with the export of Minoan textiles. In this case also, few, high value, garments should be the rule, within a prestigious chain of exchange, and not the mass production of textiles for export.

Regional differences and different historical trajectories should also be considered. Is it by chance that the earliest dyeing installations, the earliest flock representations, and the most numerous sheep figurines are located in Eastern Crete? And is it by chance that the highest number of sheep recorded on tablets comes from Zakros, again in Eastern Crete? We have perhaps to conclude that areas with a lower availability of arable land, found a valuable resource in stock breeding and wool production, while, on the contrary, palaces with rich surrounding plain chose to focus their attention on agriculture. The same phenomenon of economic differentiation, with different strategies, has been detected in the Mallia plain.⁵⁵

On the other hand, as we saw before, wool is not equivalent to textiles, but wool was also an item of exchange, as demonstrated by the identification of a wool unit in the weight system. This happened not under palatial control, but instead in connection with harbours and trading centres. The ostrakon from Thera demonstrates how much non palatial centres, with little grazing land, could be involved in the trade of wool.

In the Neo-palatial period, Minoan states evolved towards a more organized system based upon a hierarchy of minor 'palaces' and villas. Iconography also attests this development toward the adoption of more international symbols of power, as processions.⁵⁶ When the Mycenaeans came, they understood the high potential of the existing tradition of textile manufacture and transformed a loose and polycentric mode of production into a true palatial controlled industry. But this is outside the scope of this paper.

Abbreviations

AS *Annuario della Scuola Archeologica Italiana di Atene.*

Aeg *Annales d'archéologie égéenne de l'Université de Liège. Université de Liège, Histoire de l'art et archéologie de la Grèce antique. Université de Liège.*

AJ *American Journal of Archaeology.*

AG *Greek Textiles* M. L. Nosch (eds), *Ancient Textiles, Production, Craft and Society, Proceedings of the First International Conference on Ancient Textiles, Lund, Sweden, Copenhagen, Denmark, 19–23 March 2003.* Oxford.

BA *British Archaeological Reports, British Series.*

BC *Bulletin de correspondance hellénique.*

BS *Bulletin of the Institute of Classical Studies of the University of London.*

BSA *Annual of the British School at Athens.*

- CHOIVIER, J.-P. and Godart, L., *Corpus Hieroglyphicarum Inscriptionum Cretae. Et. Crèt.* 31, Athènes 1996.
- CMSCorpus der minoischen und mykenischen Siegel.
- CretaAntica (ed.), *Rivista internazionale di studi archeologici, storici ed epigrafici* (peer review), vols I–XI, 2000–2010. Padova.
- Et.CrètLes crétoises.
- GODART, L. and Olivier, J.-P., *Recueil des inscriptions en linéaire A*, I–V. Paris 1976–1985.
- Hesperia. The Journal of the American School of Classical Studies at Athens.
- Kosmos. Zeitschrift für vor- und frühgriechische Epigraphik.
- KOMMOS. Shaw and M.C. Shaw (eds), *Kommos V. The Monumental Minoan Buildings at Kommos*, Princeton NJ 2006.
- KORLAFFINEUR and M.L. Nosch (eds), *Kosmos: Jewellery, Adornment and Textiles in the Aegean Bronze Age. Proceedings of the 13th International Aegean Conference/13e Rencontre égéenne internationale, University of Copenhagen, Danish National Research Foundation's Centre for Textile Research, 21–26 April 2010*. *Aegaeum* 33. Leuven and Liege.
- MIREVISTA de filología egea.
- SilSileño: rivista di studi classici e cristiani. Catania.
- PLA parola del passato.
- SIMStudies in Mediterranean Archaeology.
- TEKEMERIA: symboles sten historia tou hellenikou kai romaikou kosmou. Thessaloniki.

Bibliography

- Alberti, M. E. (2003) I sistemi ponderali dell'Egeo nell'età del bronzo. Studi, storia, pratica e contatti. *ASAtene* 81, 597–640.
- Alberti, M. E. (2004–2005) *Gli impianti di lavorazione delle fibre tessili nell'Egeo dell'Età del Bronzo, con particolare attenzione alla ceramica di uso industriale*. Tesi di dottorato, Università di Udine, a.a. 2004–2005.
- Alberti, M. E. (2007a) The Minoan Textile Industry and Territory from the Neopalatial to Mycenaean Times: Some First Thoughts. *Creta Antica* 8, 243–264.
- Alberti, M. E. (2007b) Washing and Dyeing Installations of the Ancient Mediterranean: Towards a Definition from Roman Times back to Minoan Crete. *Ancient Textiles*, 59–63.
- Alberti, M. E. (2008) Textile Industry Indicators in Minoan Work Areas: Problems of Typology and Interpretation. In C. Afaro and L. Karali (eds), *Vestidos, Textiles y tintes, Actes II Symposium Internacionales obre Textiles, Atenas 2005*, 25–35. *Pupureae Vestes II*. Valencia.
- Apostolou, V., Brogan, T. M. and Betancourt, P. P. (2012) The Minoan Settlement on Chryssi and its Murex Dye Industry. *Kosmos*, 179–182.
- Barber, E. J. W. (1991) *Prehistoric Textiles. The Development of Cloth in the Neolithic and Bronze Ages with Special Reference to the Aegean*. Princeton NJ.
- Bendall, L. M. (2003) A Reconsideration of the Northeastern Building at Pylos: Evidence for a Mycenaean Redistributive Center. *AJA* 107:2, 181–231.
- Bennet, E. L. (1972), Linear B Sematographic Signs. In M. S. Ruipérez (ed.), *Acta Mycenaea. Proceedings of the Fifth International Colloquium on Mycenaean Studies*, Salamanca 1970, 55–72. *Minos* 11. Salamanca.
- Betancourt, P. P., Apostolou, V. and Brogan, T. M. (2012) The Workshop for Making Dyes at Pefta, Crete. *Kosmos*, 183–186.
- Bintliff, J. (1977) *Natural Environment and Human Settlement in Prehistoric Greece*. BAR 28, Oxford.
- Bosanquet, R. C. (1903) Palaikastro Excavations I. *BSA* 8, 294.
- Bosanquet, R. C. and Dawkins, R. M. (1923) *Unpublished Objects From Palaikastro Excavations*, London.
- Boulotis, C. (1998) Les nouveaux documents en linéaire A de Akrotiri (Thèra): Remarques préliminaires. *BCH* 122, 407–411.
- Breniquet, C. (2008) *Essai sur le tissage en Mésopotamie. Des premières communautés sédentaires au milieu du IIIe millénaire avant J.-C.*, Travaux de la Maison René-Ginouès 5, Paris.
- Brogan, T. M., Betancourt, P. P. and Apostolou, V. (2012) The Purple Dye Industry of Eastern Crete. *Kosmos*, 187–192.
- Burke, B. (1997) The Organization of Textile Production on Bronze Age Crete. In R. Laffineur and

- P. P. Betancourt (eds), *TEHNI: Craftsmen, Craftswomen and Craftsmanship in the Aegean Bronze Age*, Proceedings of the 6th International Aegean Conference, Philadelphia Temple University 18–21 April 1996, 413–422. Aegaeum 16. Liège.
- Burke, B. (1999) Purple and Aegean Textile Trade in the Early Second Millennium BC. In P. Betancourt, V. Karageorghis, R. Laffineur and W.-D. Niemeier (eds), *MELETEMATATA. Studies in Aegean Archaeology Presented to Malcolm H. Wiener as he Enters his 65th Year*, 75–82. Aegaeum 20, Liège.
- Burke, B. (2006) Textile Production at Petras: The Evidence from House 2. In E. Tampakaki and A. Kaloutsakis (eds), *Pepragmena Th'Diethnous Kritologikou Synedriou, Elounta, 1–6 Oktovriou 2001. A1: Proistoriki Periodos, Anakafika Dedomena*, 279–295. Herakleion.
- Burke, B. (2010) *From Minos to Midas: Ancient Cloth Production in the Aegean and in Anatolia*. Ancient Textiles Series 7. Oxford.
- Del Frio, M., Nosch, M.L. and Rougemont, F. (2010) The Terminology of Textiles in the Linear B Tablets, Including Some Considerations on Linear A Logograms and Abbreviations. In C. Michel and M. L. Nosch (eds), *Textile Terminologies from the Third to the First Millennium BC in the Ancient Near East and the Eastern Mediterranean Area*, 338–373. Ancient Textiles Series 8. Oxford.
- Doumet, J. (1980) *A Study on Ancient Purple*. Beirut.
- Driessen, J., Schoep, I. and Laffineur, R. (2002) Monuments of Minos. Rethinking the Minoan Palaces. In J. Driessen, I. Schoep and R. Laffineur (eds), *Crete of the Hundred Palaces? Proceedings of the International Workshop, Université Catholique de Louvain, Louvain-la-Neuve 14–15 December 2001*. Aegaeum 23, Liège.
- Evans, A. (1921) *The Palace of Minos* I, 111. London.
- Evely, R. D. G. (2000) *Minoan Crafts: Tools and Techniques. An Introduction*. II. SIMA 92.2. Jonsared.
- Finkelberg, M. (1998) Bronze Age Writing: Contacts Between East and West. In E. H. Cline and D. H. Harris-Cline (eds), *The Aegean and the Orient in the Second Millennium, Proceedings of the 50th Anniversary Symposium, Cincinnati 18–20 April 1997*, 265–272. Liège.
- Haegg, R. and Marinatos, N. (1987) (eds) *The Function of the Minoan Palaces, Proceedings of the Fourth International Symposium at the Swedish Institute, Athens 10–16 June 1984*. Swedish Institute in Athens, Series in 4, 35. Stockholm.
- Halstead, P. and Isaakidou, V. (2011) Revolutionary Secondary Products. In T. C. Wilkinson, S. Sherratt and J. Bennet (eds), *Interweaving Worlds*, 64–65. Oxford.
- Kannava, A. (2005) The Tell Haror Inscription and Crete. A Further Link. In R. Laffineur and E. Greco (eds), *Emporia, Proceedings Conference, Athens 2004*, 837–843, Aegaeum 25. Liège and Austin.
- Kantor, H. J. (1947) The Aegean and Orient in the Second Millennium BC. *AJA* LI, 30–32.
- Killen, J. T. (1994) Thebes Sealings, Knossos Tablets, and Mycenaean State Banquets. *BICS* 39, 67–84.
- Kopaka, K., and Platon, L. (1993), Lini minoïki. Installations minoennes de traitement des produits liquides. *BCH* 117, 35–101.
- Lafont, B. (1992) Messagers et ambassadeurs dans les archives de Mari. In D. Charpin and F. Joannès (eds), *La circulation des biens, des personnes et des idées dans le Proche-Orient ancien*, Actes XXXVIIIe RAI, Paris 1991, 167–183. Paris.
- Lurz, N. (1994), *Der einfluss Aegyptens, Vorderasiens und Kretas auf die mykenischen Fresken*, Europaeische Hochschulschriften. s. XXXVIII, vol. 48, Frankfurt a. M.
- Manning, S. W. (2010), Chronology and Terminology. In E. Cline (ed.), *The Oxford Handbook of the Bronze Age Aegean*, 11–28. Oxford.
- Marinatos, S. and Hirmer, M. (1973) *Kreta, Thera und das mykenische Hellas*, München.
- McCorriston, J. (1997) The Fiber Revolution. Textile Extensification, Alienation and Social Stratification in Ancient Mesopotamia. *Current Anthropology* 38–4, 517–549.
- Melena, J. L. (1975) Studies on Some Mycenaean Inscriptions Dealing with Textiles. *Minos* suppl. 5. Salamanca.
- Michailidou, A. (1992–1993) Ostrakon with Linear A Script from Akrotiri (Thera): A Non-bureaucratic Activity? *Minos* 27, 7–24.
- Militello, P. (1991) Per una classificazione degli archivi nel mondo egeo. *Sileno* 17, 327–347.
- Militello, P. (1999) Nilotic Models and Local Re-elaborations: The Ayia Triada Example. In A.

- Karetsou (ed.), *The Relations Between Crete and Egypt 1600–600 BC. (Catalogo mostra Herakleion 1999)*, 78–85. Athens.
- Militello, P. (2002) Amministrazione e contabilità a Festòs. II. Il contesto archeologico dei documenti palatini 51–91. *Creta Antica* 3.
- Militello, P. (2007) Textile Industry and Minoan Palaces. In E. Andersson, B. Burke, C. Gillis and M. L. Nosch (eds), *Ancient Textiles. Production, Crafts and Society, Conference Lund-Copenhagen 2003*, 36–45. London.
- Militello, P. (2011) Immagini e realtà della produzione nella Creta minoica: il tema assente. In F. Carinci, N. Cucuzza, P. Militello and O. Palio (eds), *Kretes Minoïdos. Tradizione e identità minoica tra produzione artigianale, pratiche cerimoniali e memoria del passato*. Studi offerti a V. La Rosa, 239–258, Padova.
- Militello, P. (2012), *Festòs e Haghia Triada. Rinvenimenti Minori. I. Materiale per la tessitura*. Padova.
- Militello, P. (2012b) Per la dea, per il signore o per gli hetairoi? Cerimonie collettive e pasti rituali a Creta in età tardominoica. In D. Palermo et al. (ed.), *Cibo per gli uomini, cibo per gli dei. Archeologia del pasto rituale*, Atti della riunione scientifica, Piazza Armerina 2005, vol. 1, 109–120. Acireale.
- Militello, P. (in press) Wool and Linen in Neolithic Crete. In R. Laffineur et al. (eds), *Physis*. 14ème rencontre égéenne internationale, Paris 2012, in press.
- Militello, P. (in press b) Some Eccentric Linear A Tablets from Phaistos and Ayia Triada. In P. Militello and H. Oniz (eds), *SOMA 2011, Proceedings conference, Catania 2011*, Oxford 2012.
- Mina, M. (2008) Figurin' Out Cretan Neolithic Society: Anthropomorphic Figurines, Symbolism and Gender Dialectics. In V. Isaakidou and P. Tomkins (eds), *Escaping the Labyrinth. The Cretan Neolithic in Context*, 115–135. Sheffield Studies in Aegean Archaeology 8. Oxford.
- Müller, W. (1999) Die Tonplomben und andere gestempelte Tonobjekte. *CMS* 2:6, 339–519.
- Muller Celka, S., Puglisi, D. and Bendali, F. (in press) Population and Resource Exploitation in LM I Malia. In R. Laffineur et al. (eds), *Physis*. 14ème rencontre égéenne internationale (Paris 2012).
- Niemeier, W.D. (1991) Minoan Artisans Travelling Overseas: The Alalakh Frescoes and the Painted Plaster Floor at Tell Kabri (Western Galilee). In R. Laffineur and L. Basch (eds), *Thalassa. L'Égée préhistorique et la mer, Actes de la troisième rencontre égéenne internationale de l'Université de Liège, Station de recherches sous-marines et océanographiques (StaReSo), Calvi, Corse, 23–25 Avril 1990*, 189–201. Aegaeum 7. Liège.
- Nosch, M.L. (2000) Acquisition and Distribution: ta-ra-si-ja in the Mycenaean Textile Industry. In C. Gillis, C. Risberg and N. Sjöberg (eds), *Trade and Production in Premonetary Greece, Proceedings Conference, Athens 1996*, 42–62. Jonsered.
- Olivier, J.-P. and Oren, E.D. (1996) A Minoan Graffito from Tel Haror. *Cretan Studies* 5, 98–109.
- Palaima, T.G. (1994) Seal-users and Script-users: Nodules and Tablets at LM I B Haghia Triada. In P. Ferioli, E. Fiandra, G.G. Fissore and M. Frangipane (eds), *Archives before Writing, Proceedings of the International Colloquium, Oriolo Romano 23–25 October 1991*, 307–330, Rome.
- Palaima, T.G. (2004) Sacrificial Feasting in the Linear B Documents. *Hesperia* 73, 217–246.
- Parise, N. (1986) Pesi egei per la lana. *PP* 227, 81–88.
- Parrot, A. (1958) *Mission Archéologique de Mari II. Le Palais. Peintures Murales*. BAH 69. Paris.
- Pelon, O. (1983) Réflexions sur la fonction politique dans un palais crétois. In O. Krzyszkowska and L. Nixon (eds), *Minoan Society, Proceedings of the Cambridge Colloquium 1981*, 251–257. Bristol.
- Perna, M. (1995) The Roundels of Phaistos. *Kadmos* 34, 103–122.
- Perna, M. (1999) Il sistema amministrativo minoico nella Creta prepalaziale. In V. La Rosa, D. Palermo and L. Vagnetti (eds), *Epi ponton plazomenoi: Simposio italiano di Studi Egei dedicato a Luigi Bernabò Brea e Giovanni Pugliese Carratelli, Roma 18–20 febbraio 1998*, 63–68. Roma.
- Peterson, S.E. (1986), *Wall Painting in the Aegean Bronze Age: The Procession Frescoes*. Ann Arbor Michigan.
- Petrusio, K.M. (1986) Wool Evaluation at Knossos and Nuzi. *Kadmos* 25:1, 26–37.
- Pilali-Papasteriou, A. (1985) *Die Bronzenen Tierfiguren aus Kreta*. München.
- Piteros, C., Olivier, J.P. and Melena, J.-L. (1990) Les Inscriptions en linéaire B des nodules de Thèbes (1982): la fouille, les documents, les possibilités d'interprétation. *BCH* 114, 103–181.
- Platon, L. (1993) Ateliers palatiaux minoens: une nouvelle image, 103–131. *BCH* 117, 103–131.
- Poursat, J.-C. (2008) *L'art égéen. Grèce, Cyclades, Crète*, Paris.

- Rahmstorf, L. (2003) The Identification of Early Helladic Weights and their Wider Implications. In F.K. Polinger and R. Laffineur (eds), *Metron: Measuring the Aegean Bronze Age. Proceedings of the 9th International Aegean Conference/9e Rencontre égéenne internationale, New Haven, Yale University, 18–21 April 2002*, 293–299, *Aegaeum* 24. Liège.
- Ruscillo, D. (1988) Working Double Tides: The Marine Molluscs from Kommos, Crete. *AJA* 102, 392.
- Ruscillo, D. (2005) Reconstructing Murex Royal Purple and Biblical Blue in the Aegean. In D. Bar-Yosef Mayer (ed.), *Archaeomalacology*, 99–106. Oxford.
- Ruscillo, D. (2006) Faunal Remains and Murex Dye Production. *Kommos* V, 776–840.
- Schoep, I. (2002) The Administration of Neopalatial Crete. A Critical Assessment of the Linear A Tablets and their Role in the Administrative Process, *Minos* suppl. 17, Salamanca.
- Schoep, I. (2006) Looking Beyond the First Palaces: Elites and the Agency of Power in EM III-MM II Crete. *AJA* 110.1, 37–64.
- Smith, W.S. (1965) *Interconnections in the Ancient Near East: A Study of the Relationships Between the Arts of Egypt, the Aegean, and Western Asia*, 18. New Haven.
- Tsipopoulou, M. (2012) (ed.) *Petras Siteia. 25 years of Excavations and Studies*. Monographs of the Danish Institute at Athens 16. Athens.
- Tzachili, I. (1997) *Hyphantiki kai hyphantes sto proistoriko Aigaio*, Herakleion.
- Vanschoonwinkel, J. (1996) Les animaux dans l'art minoen. In D. S. Reese (ed.), *Pleistocene and Holocene Fauna of Crete and its first Settlers*. Monograph in World Archaeology 28, Madison, 351–412.
- Vlasaki, M. and Hallager, E. (1995) Evidence for Seal Use in Pre-palatial Western Crete. In W. Müller (ed.), *Sceaux minoens et mycéniens: IVe symposium international, Clermont-Ferrand 10–12 Septembre 1992*, 251–270. CMS Beiheft 5. Berlin.
- Warren, P. (1972) Myrtos: An Early Bronze Age Site in Crete. *BSA* suppl. 7, 330–331. London.
- Warren, P. and Hankey, V. (1989) *Aegean Bronze Age Chronology*. Bristol.
- Weingarten, J. (1990) Three Upheavals in Minoan Sealing Administration: Evidence for Radical Change. In T.G. Palaima (ed.), *Aegean Seals, Sealings and Administration, Proceedings of the NEH-Dickson Conference of the Program in Aegean Scripts and Prehistory of the Department of Classics, University of Texas at Austin January 11–13, 1989*. *Aegaeum* 5, 105–120. Liège.
- Weingarten, J. (2000) Some Seal-impressed Weights from Eastern Crete. In A. Karetsou, T. Detorakis and A. Kalokairinos (eds), *Pepragmena H' Diethnous Kritologikou Synedriou, Irakleio 9–14 Septemvriou 1996, A3: Proistorikikai Archaia Elliniki Periodos*, 485–495. Irakleio.
- Wilson, D.E. (1999) *Keos IX*, 156. Mainz a. Rhein.
- Younger, J. (2005), Cretan Hieroglyphic Wool Units (LANA, Double Mina). In Perna, M. (ed.), *Studi in onore di Enrica Fiandra: Contributi di archeologia egea e vicinorientale*, Studi egei e vicinorientali 1, Paris, 405–409.
- Yule, P. (1980) *Early Cretan Seals*. Marburger Studien zur Vor- und Frühgeschichte 4. Mainz am Rhein.

1 Tzachili 1997, 38, notwithstanding the evidence for sheep wool already in the Neolithic. See also Burke 2010. A more cautious position is held by Barber 1991, 28.

2 See McCorriston 1997. See however the observations by Breniquet 2008, 92–93: “sheep were already bred for their meat and wool in the 8th millennium BC, and the ‘secondary products revolution’ (Sherratt) was more a change in the modes of their exploitation than a true innovation”. For a review of Sherratt’s theory, see now Halstead and Isaakidou 2011.

3 Evans 1921, 111; Kantor 1947, 30–32; Parrot 1958; Smith 1965, 18.

4 Bintliff 1977, 11: “Prehistoric cultures of Greece were fundamental agricultural, pastoral and piscatorial...” See also Pelon 1983 and the many contributions in Haegg and Marinatos 1987.

5 Barber 1991, 330–357, with a systematic review of all the evidence and a technical analysis of the motifs. Shaw 2001, with special reference to the Knossian procession.

6 Niemeier 1991, 1995 with the mention of the cananean myth of *Quadesh wa Amrur*, sent by *Kothar wa Hasis* from Kaphtor (Crete) to build and decorate the Baal palace.

7 Militello 2012; Militello in press.

8 Doumet 1980; Barber 1991, 223–246; Breniquet 2008, 126–132. For the Aegean area: Ruscillo 1988, 2005, 2006 (Kommos); Evely 2000, 504 and above all Burke 1997; Burke 2010, 34–39 for a wider picture. For eastern Crete: Betancourt, Apostolakou and Brogan 2012; Apostolakou, Brogan and Betancourt, 2012; Brogan, Betancourt and Apostolakou 2012. Dyeing installations, however, are not

- easy to identify among all the archaeological evidence referring to the processing of liquids (be they oil, wine, water etc.), as Alberti has shown: Alberti 2004–2005; 2007a; 2007b; 2008.
- 9 Warren 1972, appendix 3 (Bowyer), 330–331.
 - 10 Barber 1991, 240. For animal bones: Warren 1972, appendix 6 (M. R. N. Jarman), 318–320.
 - 11 Burke 2010, 31.
 - 12 Burke 2010, 32–34.
 - 13 Burke 2006.
 - 14 Ruscillo 1998, 2005, 2006.
 - 15 Apostolakou, Brogan and Betancourt 2012.
 - 16 Rahmstorf 2003, 2010, 2011.
 - 17 Wilson 1999, 156; Alberti 2003, 609.
 - 18 Mina 2008.
 - 19 Vanschoonwinkel 1996, 351–412. For animal figurines see also Pilali-Papasteriou 1985, 128–129.
 - 20 First publication: Bosanquet 1903, 294 (with no pictures). Evans 1921, 180 and 181, fig. 130.
 - 21 Dawkins in Bosanquet, Dawkins 1923, 12 and plate VII. The interpretation as oxen is repeated, probably basing simply on Evans' publication, by Marinatos and Hirmer 1973, comment to plate 18.
 - 22 Complete catalogue of ovides and caprids in Vanschoonwinkel 1996. For the seals mentioned: Yule 1980, tav. 6, mot. 6, 2–4.
 - 23 This phenomenon could simply be due to the strict range of subjects represented in Neo-palatial and Post-palatial iconography, which despite the apparent variety, refer always to subject related to the religious sphere or the political-symbolic one: see my considerations in Militello 2011, 239–258.
 - 24 Pilali-Papasteriou 1985.
 - 25 Burke 1999, 2010.
 - 26 Militello 2011.
 - 27 Schoep 2006.
 - 28 Petruso 1986; Parise 1986. A unit of weight for wool has been identified by Younger in the hieroglyphic script, Younger 2005.
 - 29 Alberti 2009, 610.
 - 30 Vlasaki, Hallager 1995; Perna 1999.
 - 31 For a general classification of the main steps in sealing administration: Weingarten 1990.
 - 32 Müller 1999; Weingarten 2000; Review in Burke 2010, 58–59. See also Militello 2012, 40–41 (for impressed loom weights from Phaistos).
 - 33 Editions: CHIC (Hieroglyphic script), GORILA (Linear A), both with standard transumeration of signs and documents. For an introduction to Linear A: Schoep 2002, 13–65. For Minoan 'archives': Militello 1991; Schoep 2002. For the archive of Petras: Tsipopoulou 2012. A very useful survey of linear A problems with transliterated texts is also to be found at <http://people.ku.edu/~jyounger/LinearA/#3> (January 2013).
 - 34 See Del Frio, Nosch and Rougemont 2010, 348–354.
 - 35 Syllables, signs, ideograms and texts are quoted according to the system used in CHIC and GORILA. Hieroglyphic ideogram *152, with an animal head, could refer to sheep, but it is not certain and it recurs only three times in two 4 sided bar from Knossos, dated to MM II (nos 65b-65c, and no. 67), followed by one unit, together with other commodities. If these texts refer to sheep, it is surely not referring to their breeding, but to their consumption.
 - 36 Sheep: HT 38 (3 units), 132, 136; PH 31 (3 + 5); KH Wc 2063 (4), 2102 (9); PH Wc44; ZA 9 (2 + 5), ZA 22 (1 + 13 + 7 + 100), ZA 26 (13 + 7). Goats: HT 20 (fraction), 64 (6), PH 31 (2); HT Wc 3014 (3); KH 6 (1); KN Wc 29 (9). In HT 6b.5, AB22, later erased, is followed by fractions or a few units. PH Wc 44 (Perna 1995, 117–118) is a roundel with no quantity, but the three digital imprints on the border could represent the quantity: 3. See GORILA V, p. 176 and table in Schoep 2002, 121–123. In table 3.8, 121, A512 (AB21 + AB41) is also said to be written in HT 82.1. It is a mistake since in the next figure, 3.9, this is absent.
 - 37 Militello 2007; 2012b; in press b.
 - 38 Summary in Schoep 2002, 131–132. Doubts on the identification of A559 = *145 have been cast by E. L. Bennett (1972), 59.
 - 39 Schoep 2002, 121.
 - 40 Boulotis 1988.
 - 41 Militello 2002, 67–68.
 - 42 Palaima considers A717, homomorph of the Mycenaean metrological sign M, as equal to 1/30 of the talent, i.e. 1 kg. Palaima 1994, 318.
 - 43 Michailidou 1992–1993. Del Frio is however sceptical about this interpretation (Del Frio, Nosch and Rougemont 2010).

44 Palaima 1994, 317.

45 Del Freo, Nosch, Rougemont 2010, 353–354.

46 Schoep 2002, 131–133.

47 This ligature, not present in GORILA, was found 15 years ago in one inscription from Akrotiri (Boulotis 1998) and on a pottery sherd from Tel Haror (Olivier and Oren 1996). In this latter case, however, the interpretation of the sign as a ligature and not as a simple representation of a cloth is dubious, as its attribution to Linear A or Hieroglyphic script or to the so called Archanes Script (Kannava 2005).

48 Olivier, Oren 1996; Finkelberg 1998. According to Nosch, TELA + TE is “a heavy duty textile perhaps related to homeric *tapes*” since for one cloth 21 kg of wool (i.e. 28 sheep) are necessary (Burke 2010, 76, referring to the unpublished dissertation by Nosch 2000, 16 *non vidimus*).

49 Burke 2010, 76.

50 Elsewhere it occurs also with AB05 *te*, AB09 *se*.

51 For the ‘banquet texts’: Piteros *et al.* 1990; Killen 1994; Bendall 2002; Palaima 2004. For Mari: Lafont 1992.

52 An update of the discussion in Driessen, Schoep and Laffineur 2002.

53 Kopaka and Platon 1993, 92. See also Platon 1993.

54 Militello 2007.

55 Müller Celka, Puglisi and Bendali, in press.

56 See e.g. Peterson 1986, 136–165; Lurz 1994, 176–180; Militello 1999, 85.

16. Wool in the Nuzi Texts

Philippe Abrahami

This paper considers the medio-babylonian texts from Nuzi (actual Yorghana-Tepe), a site located at 13 km southwest from Kirkuk. This corpus is rich, with around 5,000 cuneiform tablets, most of them found during the excavations conducted by the American archaeologists during the years 1925–1933.¹ The time span of this documentation begins with the late part of the 15th century BC and ends with the site's final destruction due to a military campaign undertaken by the Assyrian king Aššur-uballit I (1363–1328 BC).²

A large part of this documentation records the domestic activities and personal transactions of individuals within a family unit, sometimes through several generations. It consists of titles that prove the property transfer of movables or real estate properties. Other legal documents are also represented such as testaments, adoption and marriage contracts as well as court rulings or loan and work contracts.³ Management of sometimes very vast real estate and households operated by prominent individuals such as Tehip-Tilla, son of Puhi-šeni,⁴ and prince Šilwa-Teššub, have also generated documentation of an administrative nature.⁵ Such texts record accounting operations related to the use and the income of numerous items: agricultural products, consumer goods, equipment and manpower. Beside a few private archives, the documentation found in the Nuzi Palace belongs to these types of records.⁶

Wool in the Nuzi texts is documented as a raw material in the initial stage of the collection from the flocks and through the various processes which aimed to transform it to produce clothing and fabrics. Wool also represents a staple product. Among the documentation related to domestic management, lists recording distributions of wool to the employees and family members of the household owner, shows evidence concerning the amount allocated. In addition, wool is used as a mean of payment: hired workers may have received their wages in wool. Wool together with other products is also used to buy commodities or real estate. The transfer of wool in the framework of loan contracts is also documented. This set of data will be analyzed in the present paper.⁷

1. Wool collection

1.1. Organization and bookkeeping practices

The Nuzi evidence concerning the production of wool shows the same general framework as is depicted from other periods.⁸ Flocks belonging to households were

consigned to herdsmen (*ina* ŠU NP *nadānum*) who were providing herding services to their owners.

1.1.1. 'Herding contracts'

Records listing the composition of the flocks in the care of the shepherd were drawn and sealed by him as acknowledgment of his liability.⁹ However, as against other documentary evidence, Nuzi records are mostly undated and the time period of the contract remains unspecified. The terms of agreement that would secure the remuneration of shepherds are not stipulated. Nevertheless, Morrison has suggested that the expected yield of the flocks and the subsequent herdsman's share may have been implicitly deduced from the composition of the flocks as stated in the herding contracts.¹⁰

However, some herding consignments might have stipulated more precise instructions. Such is the case with EN 9/2 298 (S113), one of the texts involving livestock from the archive of Šehal-Teššub, son of Tehup-šenni. By contrast to the other consignments texts, it is formulated as a declaration before witnesses of the two shepherds. Moreover there is an explicit mention of their task: they received the 10 sheep 'for herding'. The time for the return of the flock is stipulated as being the beginning of month Impurtanni (March/April), probably at plucking time (see § 1.2.3).¹¹ The contract mentions also that the sheep have to be returned to Nuzi where they have been handed over.

It should be also taken into account that a herding agreement could have been described as an animal loan contract. This could be the case with HSS 5 2 (A 34) a loan (*ur₅-ra*) of "three sheep and one goat" granted by Šuriha-ilu to Haniyu who acknowledges his liability to hand over "three sheep, two spring lambs, one goat, one spring doe-kid and three kuduktu of wool" at the end of month Impurtanni (March / April). It might well be considered that the wool and the flock correspond to the interest paid by the debtor.¹² Another possibility would be that this loan contract masks a herding transaction in which the returned flock and the amount of wool represented the expected growth and the wool yield minus the wage paid to Haniyu.¹³

Nuzi evidence shows that occasionally, together with the herding consignments, a clay bulla kept by the herdsmen and sealed by him was produced. It contained a number of stones corresponding to the livestock inscribed on its surface on the one hand, and on the consignment tablet on the other hand. This system was intended to protect both sides. The shepherd was insured against excessive request in terms of flock growth; the owner's flocks against exaggerated loss.¹⁴ Transfers of livestock were not always recorded with this device and that is explained in the note within ledgers and receipts that the counting stones were not deposited (*la nadû*), nor removed (*la šulû*) or not transferred (*la šubalkutu*).

1.1.2. Accounts of plucking

As already noted by Morrison, the collection of wool was not included within the herdsmen service.¹⁵ In these cases, the shepherd handed over the flocks under his care for an operation designated by the expression 'to (make) enter for the plucking' (*ina buqûni erêbu* / *šurubu*).¹⁶ The plucking was placed under a supervisory authority acting on behalf of the flock owner as shown by the palace receipt HSS 13 156* (R76). The tablet sealed by the shepherd records the number of flocks that were received for plucking:

12 ewes under the care of Šilahi the herdsmen, Elhip-Tilla the governor of (the palace) of Nuzi has plucked. (Seal Impression). Seal of Šilahi.¹⁷

Other documents concerning plucking are acknowledgements of his ‘deficit’ (*mutṭû*) by the herdsmen which are also sealed by him.¹⁸ These documents contain the detailed list of the flocks determined as ‘deficit’ and usually include the operative clause ‘he will enter for plucking’.¹⁹ Such is the case with HSS 13 478 (AdŠ 389):

4 old bearing ewes, 6 lambs, 1 ram twice plucked, deficit of Hanaya son of Apaya. He will make enter for plucking. The stones weren’t deposited. (Seal Impression). Seal of Hanaya son of Apaya.²⁰

Ledgers recording the number and type of plucked livestock and the name of the herdsmen who were in charge of it are well represented in the Nuzi documentation.²¹ From the palace, the short notice HSS 13 189 (M79) records the marked flocks of Zige (5 wethers and 3 ewes) which were plucked. From the archive of Šilwa-Teššub, HSS 13 224 (AdŠ 418) indicates the number of rams and goats from different herdsmen which were shorn (*gazzu*). HSS 13 56 (AdŠ 371) is a list of 17 sheep from Wantia son of Wiriš-tanni which were “plucked at plucking (time)” (*ša buqūni baqnū*). Such documents were called ‘tablet of plucking’ (*tuppu ša buqūni*), an appellative which is found in a single occurrence: HSS 13 249 (= AdŠ 417) concerns a total of 70 sheep (*udu-meš*) gathered from three different herdsmen:

3 bearing ewes, 6 ram-lambs of Qanie. 7 adult rams, 4 ram-lambs once plucked of Warate. 20 bearing ewes, 20 adult rams, 6 ram-lambs, 4 ewe-lamb. Total 70 sheep of Wantia. Tablet of plucking.²²

On the basis of information drawn from the ‘tablet of plucking’, the administration could get an overall estimation of the number of plucked flocks. This phase of the accounting procedure is represented by HSS 13 487 (AdŠ 414), HSS 16 244 (AdŠ 413) and HSS 16 247 (AdŠ 412). These are unsealed notices that record the total number of plucked livestock.²³ However, we do not have the account that gives the global production of wool (see § 1.2.4).

The collected wool seems to have been stocked while keeping track of the flock that produced it and therefore to its shepherd. This is clearly shown by a label, probably attached to the wool container, that bears the text “Wool, Ewes of Naišeri and Kummiya”.²⁴

1.2. The process of collection

1.2.1. Plucking and shearing

The process of collecting hair/wool from the animal is described by two verbs: *gazāzu* (to shear) is used in connection with goats, and *baqānu* (to pluck) with sheep.²⁵ As such, among other texts, SANTAG 4 64 illustrates this specific distribution. This document records Arip-ukur’s declaration that he has replaced the cow given to his debtor by “3 wethers twice plucked, 1 ewe twice plucked, 1 doe twice shorn and 2 bucks twice shorn”.²⁶

This consistent reference to the process of plucking as the usual method operated for collecting wool from sheep strongly suggest that the common breed was of moulting type.²⁷ Furthermore the characterization by the number of instances of plucking/shearing is mostly found in Nuzi texts.²⁸ Usually the animal

is said to have undergone one or two plucking/shearing events although higher number are sometimes attested.²⁹ This system of accounting seems then to be mainly restricted to express the age of young animals and may be also indirectly indicative of the quality of the wool. Based on zootechnics observation, a spring born lamb (*kalūmu hurāpu*) would be a yearling sheep when it was plucked for the first time and 18 months old for a lamb born in autumn (respectively 2 years old or 2 years and half when it was plucked for the second times).³⁰

Baqnū is also used to characterize wool just plucked. It occurs once with this meaning in HSS 5 14: 9, a declaration of Hešmi-Tilla son of Zikummi that he has received one anše of barley and three minas of plucked wool (*baqimātu*) as the price ('its silver') for a field.³¹

There is no specific information as to the implement used for collecting the wool or the goat hair in the Nuzi documentation.³²

1.2.2. Washing the flocks

The washing of the flocks before the plucking was first highlighted by Cassin in her discussion of the loan contract JEN 541.³³ In this transaction, Kel-Teššub, an army officer, advances three anše of barley to Ipšahalu, repayable after the harvest.³⁴ As an interest charge, Ipšahalu acknowledges his obligation to hand over to Kel-Teššub 'a good ewe twice plucked' in the month Iaratu (April/May).³⁵ Then follows (l. 10), the statement that in case the ewe "goes down to the water, he (the debtor) will give (the ewe) with her lamb."³⁶

Cassin's argument as regard the washing of the flocks before harvesting the wool is based on her own ethnological observation and on the Mari letter ARM V 67 where this operation precedes the plucking.³⁷ Meqīpum, the author of the letter was sent by the king to the northern Djezira probably to take delivery of the freshly plucked wool. Upon arrival he finds, that because of the lack of personnel, the instruction of the king that "the sheep be washed in order to operate the plucking" couldn't be carried out.³⁸ Toward the end of the letter (l. 38), Meqīpum alerts the king about the risk of losing the wool harvest: "the sheep were washed a long time ago, the sheep's wool is falling out".³⁹ This clear evidence of the moult enhances the fact that both operations needed to be proceeded immediately one after the other. The concomitant nature of the washing and the plucking certainly helped to reduce the wool lost that occurred with moulting sheep.⁴⁰ Cassin's conclusion was that 'going to the water' in JEN 541 stands here also for plucking.⁴¹ According to her understanding if the ewe was plucked, the interest would have been of less value. The creditor then demands that the lamb should be added as compensation

1.2.3. Time of collection

Textual documentation outside the Nuzi corpus and ethno-archeological observations strongly supports the suggestion that the wool was plucked during spring.⁴²

The Nuzi consignments tablets do not give any evidence on the time of the wool harvest as they are not dated by a month.⁴³ However information on this question is available through other textual sources.

The seasonal collection of wool during spring is documented by the expression 'spring plucking' (*tīšu buqūni*) which is found in two texts. It refers to three ewes in HSS 13 56 (AdŠ 411), an account of 14 sheep handed over for fattening. HSS 13

248 (AdŠ 415) gives a list of shepherds with the lambs under their care that were plucked at this time of the year.⁴⁴

Other texts offer the opportunity to link the wool harvest with a specific month. As already noted (§ 1.1.1), the herding consignment EN 9/2 298 (S113) and the 'loan contract' HSS 5 2 indicate that the animal should be returned in the month Imputanni (March/April). It may be reasonably assumed that this is evidence of 'spring plucking'. From JEN 541 (see § 1.2.2), it has been shown that the plucking might have been performed in month April/May. Other texts make it possible to show that the plucking occurs before or during month Hinzuri-Kurilli (May/June).⁴⁵

Direct evidence is provided by HSS 5 82 (A 34) which suggest that the plucking of young animals might have been done later than for adult sheep (at late spring or early summer).⁴⁶ In this *tidennūtu* loan contract from the archive of Ilānu, son of Tayuki, the items borrowed for a period of three years includes: one new garment weighing six minas, three ewes, one ram three times plucked and "one spring lamb which was plucked in the month of Kurilli (May/June)".⁴⁷

Two other texts refer to the transfer of livestock in the month of Hinzuri. In both texts the animal is described by an expression which might be interpreted as characterizing a new growth of wool.

In HSS 5 38 (A 34), another *tidennūtu* loan contract from the archive of Ilānu, two ewes four times plucked, two ewes three times plucked, two spring ram-lambs "(having) a second (fleece)" (*terdennūti*)⁴⁸ and three mina of wool are borrowed. The items are to be returned in the same month, probably then a year later.

HSS 5 96 (A 34) from the archive of Šuriha-ilu, son of Ellaya, is a receipt drawn before witnesses in which two brothers, Haniyu and Alkiya, acknowledge that they have received two ewes "plucked once and carrying a second (fleece)" (*šaniāma našū*). The animals were given at the end of month Hinzuri (May/June) and should be returned at the same time, probably one year later. In case that they did not satisfy this obligation, the owner of the ewes will seize as a payment "among sheep that will be born."⁴⁹ If we assume that the plucking was done in early April, it might possible that the second growth of wool is already visible by the end of June.

Tablet BM 104795 is most interesting as it shows that the collection of wool was also performed at the end of summer. It is a declaration concerning a debt of four *kuduktu* of wool to be reimbursed "at the plucking (time) of month Arkapinnu (August/September)".⁵⁰ In the event that the debtor fails to fulfill his obligations, he will pay as a fine 8 *kuduktu* of wool.

1.2.4. Wool yield

Textual documentation provides various data concerning the quantity of wool that one sheep can yield. In the Ebla archives, one sheep would supply 0.8 kg of wool.⁵¹ Calculations on different Ur III texts suggest an average yield of 0.7 kg to 1.12 kg of wool.⁵² From the Nanna-Ningal temple archive in Ur at Old Babylonian times, the expected yield of wool per sheep is estimated around 0.83 kg.⁵³ A somewhat higher growth of 1 kg (2 minas) is found in contracts from Larsa related to the same period.⁵⁴ Mari documents indicate a rate of 1.2 kg (2 ½ minas) per sheep.⁵⁵ The information collected from Middle Assyrian documentation show an average of 0.6 kg (1 ⅓ minas) per animal.⁵⁶ As for Neo-Babylonian and

Achaemenid herding contracts, the standard clauses dealing with the expected yield estimate as 0.75 kg (1 ½ minas) of wool per sheep and 0.40 kg (⅝ mina) of hair per goat.⁵⁷

Information concerning the wool yield in the Nuzi texts is very scarcely found and difficult to interpret. There are no equivalents for the wool to the accounting documents recording the yield of fields.⁵⁸ As it has been already said most of the Nuzi herds consignments are very basic as they only bear the indication to whom the flock were handed over for herding with no other stipulation concerning the growth of the flock or the expected wool yield per animal.⁵⁹

It has been suggested by Cross that one *kuduktu* represented the amount of wool produced from a single animal.⁶⁰ The 'herding contract' HSS 5 2 (A 34) (see § 1.1.1) can be used to support this suggestion, if it is assumed that Haniyu's wage didn't include payment in wool. In that case the three *kuduktu* of wool returned might have corresponded to the yield of the three ewes that he had to give back.

A rate of two *kuduktu* obtained from a plucking of one sheep was argued by Zaccagnini.⁶¹ This view was based on the palace account, HSS 13 312 (L2), which records the number of sheep and the quantity of wool received from Ili-iddina son of Naikke:⁶²

32 sheep – among which 8 plucked sheep – and 16 *kuduktu* of wool from Ili-iddina son of Naikke which were received. The wool of the 8 sheep is (still) in[scribed] in the tablet [o]f the fine. [...] of 23 [+n?] sheep [...] (reverse not inscribed).⁶³

Considering that the 16 *kuduktu* of wool were collected from the eight plucked sheep, Zaccagnini has drawn the conclusion that the wool yield was of two *kuduktu* per sheep. This view was criticized by Wilhelm who considered the document in its judicial background:⁶⁴ by judgment Ili-iddina would have been required to pay 32 unplucked sheep and 16 *kuduktu* of wool.⁶⁵ He handed over the quantity of wool required but only 24 unplucked sheep and therefore he was left with the obligation to deliver the wool that was expected to be provided by the 8 sheep. According to Wilhelm, therefore the 16 *kuduktu* and the eight plucked sheep are independent and therefore the text does not allow us to determine any ratio of wool yield per sheep.

Thus, on the question of wool yield, we are reliant on HSS 5 2 (A34), but the evidence is not beyond question. Assuming that the wool was obtained from the returned sheep, the three *kuduktu* could be indicative of an average of one *kuduktu* per sheep. However, a larger yield is also probable if Haniyu received a payment in wool.

2. Preparation of the wool

2.1. Wool qualities

Two minas of 'fine' (*damqu*) wool are listed among commodities handed over in the framework of the *tidenūtu* loan contract HSS 9 103 (A 34). JEN 128 is also concerned about wool of this quality (see § 3.4 for both texts).

Salaries paid in 'new' wool are attested in HSS 5 97 (A 34), a work contract for making bricks (see § 3.3.2).

'Poor quality' (*nuqāru*) wool is also documented.⁶⁶ The inferior quality may be connected to its origin as in HSS 15 197 (AdŠ 471) which shows that it was collected from the hide.⁶⁷ This receipt records the delivery of 60 hides to Pai-

Teššub to be given back “as soon that he has plucked the *nuqāru* wool”.⁶⁸ HSS 15 170 (AdŠ 471) gives evidence that this type of wool was used in the manufacture of the *zianātu*, a felt textile (see below n. 76). The receipt records an unspecified amount of this wool for making one *zianātu* which was distributed to Zilip-erwe, Pai-Teššub and Interta. A short note on the left edge of this tablet indicates that 6 hides ‘for plucking’ were needed for each *zianātu*.⁶⁹ The *nuqāru* wool may be also implicitly mentioned in HSS 15 195 (AdŠ 464) in which are recorded several deliveries to the same individuals for making one *zianātu* each. The materials used for this purpose includes two *kuduktu* of goat hair, five *kuduktu* of wool and “[x] hides of sheep for plucking”.⁷⁰

2.2. ‘Making the wool’

The occupation of ‘wool maker’ (lú *ēpiš* *síg-meš*) is mentioned in AASOR 16 10: 17–8, one of the legal documents recording the wrongdoing of Kušši-harpe, the mayor of Nuzi.⁷¹ The text contains the deposition of five men levelled against Birk-ilišu, one of Kušši-harpe’s accomplices. Among them, Ipša-halu, designated as weaver (lú *uš-bar*) accuses Birk-ilišu of taking one sheep (from him) and kept it, meanwhile, he released the sheep of the ‘wool makers’.⁷² Such expression as ‘maker of a product/an object’ generally designates the person in charge of manufacturing it.⁷³ Considering that the wool is the end product, the process of ‘making the wool’ appears to be connected to its preparation (cleaning, sorting) and to the process of the creation of yarn (spinning and dyeing).

Ipša-halu’s claim points out the distinction made inside the broad category of textile workers between those in charge of preparation of the material and primary production on the one hand and the weavers assigned to the making of fabrics: both activities should be treated on the same level according to Ipša-halu’s view.

The expression ‘making the wool’ is found in two documents. One is the notice from the palace, HSS 14 114*:

6 *nariu* of wool (which) were given to the care of Šarrikuti, (that) she has made. At Al-ilāni, she has settled the account with Yamaštu. (Seal impression). Seal of Šarrikuti.⁷⁴

Both women are known from other palace texts. Yamaštu’s involvement in textile manufacture is also showed by the note HSS 14 146 (M 89) recording the expenditure of 2 minas of wool taken from the queen’s supply that were given to her. Šarrikuti held probably a managerial position in the queen’s household. Two accounts, probably from the palace, HSS 14 115 and HSS 14 145, record grain expenditures for the queen’s allocation that were taken from Šarrikuti’s reserves. In HSS 14 121 (R49), she received the ‘work assignment’ (*iškaru*) that was due for the queen of Nuzi which include various types of fabrics and cloth. In HSS 14 162, she received 24 minas of wool for 6 farm workers drawn from her cloth allowance in Nuzi (see Table 16.1).

The second occurrence of the expression ‘making the wool’ is most interesting as it offers a more specialized meaning. The letter HSS 5 104 (A34) is addressed by Urhiya on behalf of the king to Turari of Nuzi and the mayor of Anzugalli. Both were asked to request from “each man of good condition” 5 women and 2 *sēpû*-men (*se-pî-e*) and to send them to a priest at the capital, Al-ilāni. Urhiya explained his request stating that “there is wool of the god Teššub that is to be done.”⁷⁵ The letter therefore pinpoints a more specific process which was carried out by ‘women’ and men whose profession, designated as *sēpû*, is now identified as felt-

worker.⁷⁶ As for the women their occupation is not specified and we are left with the mere guess that they may have cooperated in some way with the felt-maker or that they were employed in another activity such as spinning.

2.3. 'Female weaver of the thread' as spinners?

The expression occurs in the Nuzi corpus and is documented through a single reference. JEN 507 is a roster of mainly female workers belonging to Enna-mati's household.⁷⁷ The largest group which appears first in the list, records the names of 30 'women weavers of the thread' (*ušparātu ša qê*). After a blank, other occupations are listed: 3 *uzzu*[*likarû*] women⁷⁸ (l. 18); one female brewer (*sirāsû*, l. 19); 2 female millers (*tēnitu* l. 22).

The expression has been understood by the CAD as 'spinners of thread' (CAD Q, 286a) or 'female weavers using *qû* thread' (CAD I/J, 254b). The process which lies behind this occupation can be interpreted in various ways. On the one hand the activity of spinning is suggested by the fact that the work is done to make the thread. On the other hand, the designation as 'weavers' seems to indicate that the process described is more closely connected to the stage of the formation of fabrics than to the creation of yarn. An alternative interpretation which takes into account both characterizations could be that these women were in charge of preparing the warp, an operation which consists in joining threads in accordance to the length of the fabric.⁷⁹

2.4. Sorting and combing

HSS 13 225 (T19), from the archive of Tehip-Tilla records three deliveries of garments and fabrics to a woman named Nimu-mati. One of these distributions includes one mina of coloured *uqnātu*-wool 40 shekels of *tabarru* dye and 6 *kuduktu* of sorted wool (*nasqu*).⁸⁰ Another occurrence related to sorted wool is found in a short notice from the palace, HSS 14 251 (K32), that gives the available wool stocks: 107 *nariu* of sorted wool; 84 *nariu* of unsorted wool and 18 *nariu* of *šuhiwe* wool.⁸¹

Pušikku wool 'combed wool', is attested through a single occurrence in the letter HSS 9 3 (A 34) addressed by the king to Ehliap-apu.⁸² The letter deals with the transfer of this type of wool to Al-ilāni in order to produce *kuššatu* garment. The quantity of combed wool needed for this purpose is fixed at a ratio of 10 shekels per individual:

¹[To] Ellip-apu ²speak: ³thus said the king. ⁵They are making ⁴the *kuššatu*-garment of the menial workers. ⁶⁻⁷Any palace personnel ⁸who reside in Nuzi, ⁹male and female, ¹⁰10 shekels of [co]mbed (wool) each ^{LoE11}and 10 shekels of [*qer*]du? (wool) each ^{Rev12}[...] ... of (erasure), ¹³[x] shekels of combed wool ¹⁶hand it over to ¹⁴two women ¹⁵among them ¹⁹and [ma]ke them bring it ¹⁷swiftly ¹⁸to Al-ilani. ²⁰[x] shekels of combed wool ²¹that they have bring ²²[I? have retur]ned? back. ²³[Have] him sent. ^{Top24}[Seal] of Tarmi-Teššub (Seal impression).⁸³

L. 1: The unattested name Ellip-apu is probably an error for the common Ehliap-apu, see already, Gelb, Purves and MacRae, 44a. In that case, this individual could be identified with Ehliap-apu, the mayor of Nuzi see Mayer 1978, 127.

L. 4: This occurrence of the *kuššatu* garment is to be added to the entries of the CAD K, 600b and the AHw, 517a. For the Old Assyrian references to this cloth, see now Michel and Veenhof 2010, 234. For the Mari attestations, see Durand 2009, 54.

L. 11: *qerdu*, as a tentative reading, i.e. wool obtained from dead animals, see above n.

2.5. Dyeing

2.5.1. Dyes and coloured wool

Nuzi documentation provides a large number of attestations of various dyes. Some of these products are only attested in this corpus. The term that designates the dye is also used for the coloured wool produced by it. As sometimes the indication of wool is missing, the hint to its nature (dye/wool) may be drawn from the quantities used.

Selected references to dyes and the coloured wool are here presented. More information is found in the corresponding entries of the CAD.⁸⁴

hašmanu refers probably to a blue/green colour produced by woad dyeing.⁸⁵ It is not so frequently attested in the Nuzi corpus. In HSS 13 431: 49, (see i) it is found as a component of a multicoloured trim (17 *tūg-meš ša hašmanu ša birmu*). Garments and fabrics of this coloured are listed as in HSS 15 168A: r. 22 (see c). Hides dyed with a dark shade (*šūru*) of *hašmanu* colour are also attested in HSS 14 253 (see h).

bhēnzuru is, according, to a lexical equivalent, identified as a tree, maybe an apple tree (*hašhūru*). The term occurs as a dye only in the Nuzi corpus in a single case (HSS 15 223, see h). It is considered by the dictionaries as a dye with some shade of green or blue⁸⁶. The word is probably lexically connected to the red dye *inzahurētu* known from the 1st millennium sources of the Ebabbar and Eanna temples.⁸⁷

chūratu is a red dye obtained from madder and frequently associated with alum as a mordant.⁸⁸ HSS 13 47, from room L14 of the palace, records an expenditure of 27 sila received by Kip-kušuh.⁸⁹ Another palace text, HSS 15 168A (R84), gives a list of various garments designated by a colour (*ša tabarru*, l. 17, *hašmanu*, l. 22) or qualified by the dyeing product (*ša hūratu*, l. 13, 24; *ša tuhšwe* (19, 20, 23). HSS 15 212 (AdŠ 482) records the expenditure of three mina of wool that were used to buy *hūratu* and components for old chariots (§ 3.3.1). HSS 14 239 (= 601) from room L1 of the palace is most interesting. This receipt records the assigned deliveries (*iškaru*) of a number of orchards. The list of the plants produced by each orchard includes cumin, coriander, black cumin and other plants among them the *hūratu* and its seeds. In most cases the quantities are respectively 20 sila and 10 sila.

dhurhurātu is a red dye probably produced from the kermes, a parasitic insect of the eponymous oak.⁹⁰ It is only once attested, in AASOR 16 77, in which a merchant acknowledges his obligation to the palace to deliver the equivalent value of 5 talents of copper in various type of precious woods, “*uqnātu*-wool, *kinahhu*-wool and the *hurhurātu* of worms” (§ 3.1).⁹¹

ekinahhu seems to be exclusively found in the Nuzi corpus which provides numerous attestations.⁹² It is a dye possibly producing a shade of red colour. As for the other dyes, it is mostly found as a colour term for fabrics and wool.⁹³ JEN 125 is interesting to note. This text contains the oath taken by Kel-Teššub and its witnesses concerning the robbery that was perpetrated in his house in the city of Purulluwe.⁹⁴ The list of the stolen goods includes: four sheep, two sets of towels, 6 minas of wool, 10 shekels of *tamkarhu* and *kinahhu*, 13 *pahussu* - headgear and 3 minas of *šuhluhu*.⁹⁵

fqaqqaru occurs only twice according to the CAD. The term is attested at Ugarit as qualifying a cloth and at Nuzi in HSS 15 329. This text, from room R76 of the palace, is a short note by which the merchant Hanuqa acknowledges that he has received 4 minas of palace wool for the purchase of (ana *šimi*) 2 minas of *tabarru* (wool) that he will hand over to Erwi-šarri, the palace governor (§ 3.1). As *qaqqaru* qualifies the wool to be brought back, the word might designate a specific hue of red-*tabarru*.

gšurathu as a dye is only attested in the Nuzi corpus. It is assumed to be a brown dye obtained from the eponymous tree, possibly the gall oak or the walnut.⁹⁶ The wool dyed with *šurathu* is used in multicoloured trim, see HSS 15 220 and HSS 13 431 (see i) and HSS 13 34 (§ 2.5.2). CT 51 12 is a very interesting document. The first part is a final discharge given probably to a group of weavers for their performance of dyeing operations. The second part, separated by a line, records the amount of *kinahhu*, *tamkarhu* and *šurathu* for dyeing three pairs of *hullānu*

garments. All the dyes are qualified as 'good' (sig₅-qú) and 'bright' (*namru*):

As to the work assignments of last year, all their dyed fabrics were given; it is fulfilled. There is nothing that is left (to deliver). As for (the work assignment) of this year concerning three sets of hullānu-fabrics: 6 shekels of *kinahhu* fi[ne and brig]ht; 3 shekels of *tamkarh*[u] fine and bright; [3] shekels of *šurathu* fine and bright to the care of Kelip-šar[r]. (Seal impression). Seal of Šilahi-Teššub the scribe.⁹⁷

L. 3: for *bašlu* / *bašiltu* 'dyed (fabrics)', see § 2.5.2.

L. 14: Kelip-šarri is probably the same individual that appears in a roster from room L27 of the palace where the names of 25 'weavers servants of the palace' are recorded, see HSS 16 360. The same person is perhaps involved as the recipient of *hullānu* and an allowance of cloth of second quality in the palace account HSS 15 166: 27, 31 (L44). The present text is interesting evidence showing that weavers might have had the ability to perform dyeing.

L. 15: Šilahi-Teššub could be identified with the scribe active in the Šilwa-Teššub's archive, see Stein 1993b, 87 no. 4 and p. 347 no. 402.

hšūru is very common in Old Assyrian sources. As it qualifies 'white sheep', it might correspond to a darker colour, may be brownish.⁹⁸ *Šūru* is attested twice in the Nuzi corpus. In HSS 14 253, possibly a palace text, hides of *hašmanu* colour qualified as *šūru* are given to Katiri, probably a weaver,⁹⁹ for making a fastening (*tu-ti-we*). HSS 15 223 (P400) clearly indicates that the term designates a dye as it appears in close relation to the plant *urtū* and the *hēnzuru* tree. Altogether 12 shekels of these three products are delivered with *tabarru* and *kinahhu* wool to Kai-Tilla for producing *mardatu* fabrics.¹⁰⁰

i) tabarru (tawarriwe) corresponds to a red-dyed wool. In HSS 15 220, a palace account from room L27, it is distributed in various amounts (one or two mina) with *kinahhu*, *šurathu* and *takiltu* (wool) to Erwi-šarri, the palace governor and to palace weavers for manufacturing different types of fabrics.¹⁰¹ This wool is used in the production of multicoloured trim as in JEN 314 and HSS 13 431: 51 (R76) a very long palace inventory of fabrics which contains a large number of coloured items. In the delivery to Ninu-mati, HSS 13 225: 2 (§ 2.4), it is listed together with *uqnātu*-wool and sorted wool. This account mentions also a dyed garment of this colour (1 *túg bašlu ša tabarrianni*). Note that in HSS 14 250 (= 566, AdŠ 483), Pai-Teššub, the chief household of Šilwa-Teššub receives one mina of *tabarru* wool, designated as *[t]u-ú-[w]e-ni*, for buying (*šimešunu*) precious wood and aromatic (see below *l* and § 3.3.1). In HSS 13 34 (see, § 2.5.2), it is found in small quantity probably as a dye.

j) takiltu corresponds to a blue purple wool produced from the mollusc *Purpura trunculus*.¹⁰² This wool is not frequently mentioned in the Nuzi corpus. It is attested as a component of multicoloured trim in HSS 15 221 (§ 2.5.2) with other coloured wool (see HSS 15 220, i). Cushion and sash of *mardatu* fabric of this coloured wool are also found.¹⁰³

k) tamkarhu is attested exclusively in the Nuzi texts. In HSS 13 484, from room L2 of the palace, the *tamkarhu* is listed among various precious and aromatic woods that the merchant Ilitiya commits to purchase with the copper that was handed over to him. From this contextual evidence, it seems then that the *tamkarhu* was a tree from which a dye was produced. Purchase of 30 shekels of *tamkarhu* together with the same amount of *kinahhu* and *tawarru* is probably mentioned in the partially preserved letter HSS 15 222 addressed by Šurki-Tilla to the mayors of Nuzi and Anzugalli.¹⁰⁴ The relatively small amount involved here suggests that dye, and not wool, is concerned.

l) tu'e is found in HSS 14 250 (= 566, AdŠ 483) where it qualifies *tabarru* wool (see, above i). In HSS 15 225 (AdŠ 508) and HSS 15 226 (AdŠ 509) this product is used 'for' *šilannu-belt* and *tuttubū-cloth*. HSS 13 494 (AdŠ 507) is an account recording the amounts of *tu'e* received by several women (among them Tirwin-elli, see § 2.5.2).¹⁰⁵ The last line of the text indicates that the obligation of the towns of Zizza and Šilliawe concerning the deliveries of *tu'e* 'of the garments' were satisfied. The product has tentatively been identified as dye. This suggestion is based on two arguments. The word is repeatedly found in connection with textile work. Moreover, the probable meaning of the root in hurrian ('to boil'/'to cook') gives a good parallel with the process as it is described in Akkadian.¹⁰⁶

m) tuššiwē/tuššiwuhhe wool is found in multicoloured trim in HSS 13 431 (see i) and HSS 13 302 (§ 2.5.2). It is very well documented in the Mari texts where this wool appears as a precious imported product.¹⁰⁷ The probable link with the name of the *dušū* stone identified as 'chlorite', suggests a pale green coloured wool.¹⁰⁸

nūqātu, also written *sīg za-gin* which means ‘wool of lapis lazuli (colour)’. It is therefore probably a blue dyed wool. The CAD U, 195 considers that it was produced with woad (*isatis tinctoria*) on the basis of lexical equivalent in Syriac *qān ā*, *qān ā*¹⁰⁹. Beside AASOR 16 77 (see d) and HSS 13 225 (see l), this type of wool appears in HSS 14 6, a palace text from room L 44, which lists the work assignment (*iškaru*) of garments supplied by the city of Azuhiš. It is used to make a border strip (*sūnu*) ‘of a cloth for women’.¹¹⁰

urṭū is a plant which produce a dye which is attested only in the Nuzi corpus by a single occurrence (see h).

2.5.2. Dyeing

The main indication of the process of dyeing is given throughout the word *bašlu*, meaning ‘boiled’, implying the use of a bath of hot water to which dyeing substances were added. This specialized meaning is very well documented, mostly in the Nuzi corpus.¹¹¹ ‘Boiled’ is sometimes found in conjunction with ‘white’: In inventories, both adjectives are used interchangeably to qualify the same type of fabrics, suggesting that ‘white’ in this context doesn’t define a colour but means ‘not dyed’.¹¹²

Nuzi documentation gives some hints as regards the stage when dyeing was done. It could be performed on wool before weaving.¹¹³ ‘Dyed wool’ with other commodities is mentioned in the transaction between the merchant Arraphe-atal and the palace (AASOR 16 78, see § 3.1). From the palace archive, HSS 15 221 (R76) records the quantities of various coloured wool used to produce different types of fabrics: 4 minas of *kinahhe* (wool) for 2 clothes with multicoloured trim (*birnu*); 2 minas of *takiltu* (wool) for 2 pairs of *mardatu* belt; one mina of *takiltu* (wool); one mina of *šurathu* (wool) for multicoloured trim (*birnu*). HSS 13 302 (AdŠ 484) gives further evidence. The account records the quantities of wool that were received for dyeing:

3 *kuduktu* of wool given to Amur-qassa to dye in pale green (*tuhšiwe*) that she has not delivered; 3 *kuduktu* of wool given to Tirwin-elli to dye in pale green (*tuhšiwe*) that she has not delivered. (Seal impression). Seal of Tirwinelli. (Seal impression). Seal of Amur-qassa.¹¹⁴

a) Amur-qassa: Several receipts concerning textile production are sealed by her and Pai-Teššub who served as a general intendant of prince Šilwa-Teššub’s household. It seems then that Amur-qassa may have functioned at a managerial level. In HSS 15 212 (AdŠ 482), she receives 3 minas of wool for making one rein and a kind of fastening. Wool is also given to her in the broken account HSS 15 183 (AdŠ 502). Amur-qassa also appears in HSS 15 191 (AdŠ 501) together with Tirwin-elli, an account recording different types of cloth that are due from each of them (*ina* UGU *ašbū*). For the seal that she used in the present tablet, see Stein 1993b, 261 no. 262.

b) Tirwin-elli: Two documents associate this woman with textile production. In HSS 13 494 (AdŠ 507), she received, together with other women, a product (*tu’e*) used in manufacturing cloth (see, § 2.5.1). HSS 14 630 (AdŠ 78) gives the expenditure of oils and their various uses. She receives two cups (as a capacity measure) ‘for the cloth’ that she has to produce in the framework of her work assignment (*eškarātu*). This interesting evidence might illustrate the use of oil for greasing the warp yarn. This practice is probably also alluded in the testimony of a subordinate of the mayor Kušši-harpe, stating that he has collected oil and made the *saddinnu* cloths.¹¹⁵ For the seal that she used in the present tablet, see Stein 1993b, 277 n°281.

Dyeing was certainly also done on finished textiles. However the evidence here is less explicit. In some instances, the fabric for which the dye is to be used is mentioned suggesting that it was already manufactured at the time when the dye

was delivered. This is the case for instance in CT 51 12 (see § 2.5.1 g). Another example is given by the palace account HSS 13 34 (L44). The text lists the dyeing product received by the women Atte.¹¹⁶ A certain quantity of dye is to be used ‘for’ a *šilannu*-belt:¹¹⁷

Six shekels of *šurathu*, five shekels of *kinahhu*, 10 shekels of *tawarru*, 20 shekels of *tawarru* for *šilannu*-belt, Atte has received (Seal impression).¹¹⁸

3. Circulation of wool

3.1. Trading wool

The rare evidence on this question concerns transactions on dyed wool. They are represented by three documents.

HSS 5 32 (A34) is related to a cancelled transaction dealing with one mina of ‘lapis coloured’ wool (*síg za-gin-meš*). The tablet represents the written acknowledgment of Ithišta son of Ar-tae in which he declares that he has received the wool previously given for sale to Akap-šenni.¹¹⁹

AASOR 16 77 and 78 are commercial contracts between the palace and a merchant who is entrusted with movable goods for buying and selling. In AASOR 16 77, *uqnātu*-wool, *kinahhu*-wool and the *hurhurātu* dye together with precious woods are brought back by Ili-ittiya on the return of his expedition (see, § 2.5.1). In AASOR 16 78 (M 89), the merchant Arraphe-atal received “four clothes and 10 sets of *nahlaptu*-garments of second quality” for the purchase of (*šīmišunu*) of dyed wool (*síg [bá*]-áš-lu-[t]i*) and other items of which exact nature is unclear because of the damaged state of lines 9–10.

There is no indication of the origin of the coloured wool and the dyeing product in these documents. It is probable that some of these products came from the Levant as suggested by AASOR 16 77 which mention cedar wood among the products that Ili-ittiya is expected to bring back to the palace.¹²⁰ But it should be kept in mind that dyeing could be performed locally with vegetal dyes. This is clearly suggested for instance by CT 51 12 (§ 2.5.1g), JEN 125 (§ 2.5.1e) and HSS 13 302 (§ 2.5.2) which show that dyes are available for use in various households which therefore could produce their own dyed wool. Madder was also cultivated in orchards in the countryside of Nuzi (see § 2.5.1c). It is worth noting the evidence of a *dimtum* named after the *tabarru* coloured wool. That might suggest a specialized settlement in the manufacture of this dyed wool.¹²¹

In all instances, when wool was sent from one place to another, *gusānu* leather bag for packing it were used as shown by the palace letter HSS 15 291 (N120).¹²²

3.2. Wool as a staple good

By contrast to grain ration lists, there are only few lists of wool rations. These documents are mostly found among the administrative records from the Palace and Šilwa-Teššub’s households.¹²³ As most of the grain lists, these documents do not have any indication of time from which to determine the periodicity of these distributions. Therefore, it is then difficult to reach any conclusion as to the consumption per individual over a certain period of time. In this regard, evidence is given by the *tidennūtu* loan contract, HSS 5 82 (see § 1.2.3) in which a supplementary clause stipulates that the creditor will provide a son given as surety by his father with “2 minas of wool year by year as regard his clothing”.¹²⁴ It might be assumed then, that this amount would satisfy, on a yearly basis, the need

of a presumably young person, whether a boy, an adolescent or a young man, given the fact that the pledged son, is still under the authority of his father. The amounts of wool presented in Table 16.1 should be viewed in light of this quantity.

3.3. Wool as a mean of payment

3.3.1. Purchase paid with wool

Three accounts of wool expenditures from the Šilwa-Teššub's archive give an indication as to the use of wool for the purchase of various goods among other uses such as consumption or the manufacturing of fabrics. HSS 13 227 (AdŠ 475), which is also concerned to a lesser extent with expenditure on goat hair, records four minas 'for the price' of an unspecified amount of straw. In HSS 13 373 (AdŠ 373), the cost in wool for buying (*anašim*) different items are mentioned: sprouted alkali;¹²⁵ an unidentified leather object (*šešimtena*)¹²⁶ and garden (*kirê*). In EN 11/1 56 (AdŠ 478) two standard containers of beer are purchased with one mina of wool.¹²⁷

More instances of wool used as mean of payment are found in other groups of texts. In EN 9/1 7, a real estate contract from the southwest archives, one *kuduku* of wool among other goods (copper and barley) is used for the purchase (*níg-ba*) of a non-built plot (*paihu*) of unspecified dimensions. In Yale 5 which belongs to the archive of the Wullu family, wool and copper constituted the 'price' paid for wooden beams.¹²⁸ Supplementary evidence where wool was used as a purchase mean are provided by two contracts: SANTAG 4 1 stipulates that the remaining 15 shekels of silver which are due to the buyer of a slave woman should be paid either with "sheep, wool, tin silver according to an amount not yet fixed (*hašahušennu*)";¹²⁹ in SANTAG 4 155, wool is mentioned with other commodities for the payment of a real estate.¹³⁰

(L27), a work contract from the palace, records an amount of 50 minas of wool given to two individuals and describes their work assignment. The contract provides as their wages two cloths and five sets of *nahlaptu*-garments.

By contrast, there are only very few examples of wages paid in wool. In the wool account of expenditure EN 11/1 56 (AdŠ 478), two mina are recorded ‘for the potters’.¹³⁶ The other examples of wool wages in the Nuzi texts that have come down to us, seem limited to three work contracts dealing with the making of bricks.¹³⁷ Two of them come from the archive of Ilānu son of Tauki. In HSS 5 97, assuming that the salary is equally distributed between the two workers, the making of 1,000 bricks is paid for by one *kuduktu* and 15 shekels of ‘new wool’.¹³⁸ In HSS 5 98, for the same amount of bricks, the worker receives a lower wage, i.e. one *kuduktu*. However, this reduce rate is probably compensated by the food (*mākālu*) that his employer provided for him (1 bán 4 šila of barley). The third contract, HSS 13 387, belongs to the archive of Tur-šenni, Tehip-Tilla’s grandson: the wage paid is 100 shekels of wool for 1,000 bricks.

3.3.3 Other payments in wool

Payment of wool is documented once in the framework of an exchange transaction. In JEN 799, from the Tehip-Tilla’s archive, the difference between the values of the transferred fields (both with an area of 3 anše) is balanced by a supplementary payment (*utāru*) of three talents of wool.¹³⁹

Wool does not seem attested for payment in transactions concerned by adoption.¹⁴⁰ As for the marital usages, transfer of wool is documented in a single case;¹⁴¹ from the archive Ilānu comes HSS 5 16 (A 34), an agreement related to a brideprice payment which includes 5 sheep, 9 minas of refined copper, 10 minas 40 shekels of wool and 5 minas of tin.

3.4 Loan of wool

A loan of wool is indirectly mentioned in the declaration, BM 104795 (§ 1.2.3). Two other documents, JEN 128 and RATK 29, give evidence of loans of wool and sheep. In JEN 128, a tablet from room 13 of the house of Tarmi-Tilla, the transaction deals with two ‘good’ ewes and two *kuduktu* of ‘good’ wool that are to be returned “at the end of month *hutašše* (February/March) on the 30th day”. In RATK 29, from Tell al-Fahhār in the vicinity of Nuzi, the loan is concerned with two sheep also qualified as ‘good’ and with a slightly different amount of wool (2 mina and 40 shekels).¹⁴² Both contracts stipulate that in case of non-reimbursement the products of the sheep (i.e. their young and their wool) should belong to the creditor.¹⁴³

Wool is also borrowed, among other commodities, in the framework of antichresis loans.¹⁴⁴ This is the case for instance in texts already mentioned: HSS 5 38 (§ 1.2.3) and HSS 9 103 (§ 2.1).¹⁴⁵ Other evidence is found in: HSS 5 39 (A 34) from the archive of Zike son of Akkuya; HSS 9 101 (A 34) of the archive of Ilānu son of Tayuki and JEN 781, a document which originates from the archive of Tarmi-Tilla son of Šurki-Tilla.¹⁴⁶

Texts	area of the pledged field	Length of times	Items borrowed
HSS 5 38	1 anše 5 awiḥaru		6 sheep, 3 minas of wool
HSS 5 39	5 awiḥaru		2 anše 2 bān of barley, 1 kuduktu of wool 30 shekels of tin
HSS 9 101	1 anše 3 awiḥaru	4 years	14 sheep and goats, ¹⁴⁷ 8 minas of wool
HSS 9 103	1 anše	3 years	1 cloth weighing 5 minas and 50 shekels, ¹⁴⁸ 2 minas of good wool, 2 minas of tin
JEN 781	8+ awiḥaru	[...]	[...] and 2 minas of wool

Table 16.3. Loans of wool.

As a concluding remark, it might be worth mentioning here the general description of property transmitted through inheritance in testamentary documents. Among the itemized list, wool is sometimes referred to: “All installations, grain, oxen, sheep, wool, oils, and cloths” are given by the testator to his wife in HSS 19 2 (F25).¹⁴⁹ In another will, HSS 5 71 (A34), the first-born received a double share of “the buildings, the fields, the installations, the property, the oxen, the wool [...]”.¹⁵⁰ Although references to wool in such standard conveyances seem to be restricted to these two occurrences, it is nevertheless a good illustration of its importance in the household economy.

Appendix: values of measures

a) Capacity measures

1=anše bān = c. 67.4 l
 1=bān 6.7 l
 1=sila 0.8 l

b) Surface measures

1=anše ha
 1=ha 180 m²

c) Weight measures

1=talent mina = c. 30 kg
 1=mina 600 shekels = c. 500 g
 1=shekel 8.3 g

In Nuzi texts, wool and goat hair are also measured in *šehtunu*, *kuduktu* and *nariu*. The value of the *kuduktu* has been debated. The discussion is summarized in Lion and Sauvage 2005, 82 n. 71.

It is assumed here that the value of the *kuduktu* is equivalent to 80 shekels as it fits the sequential arrangement 4: 2: 1 found in other systems of weight for wool in the Near East and in the Aegean (see Zaccagnini 1990a, 313–315 and Zaccagnini 1999–2001, 51–54).

1=kuduktu 80 shekels
 1=šehtunu 160 shekels
 1=nariu 320 shekels

Notes

- a) For a possible use of a mina equivalent to 100 shekels in weighing wool, see Yale 5 and n. 134.
- b) HSS 13 245 (AdŠ 50) is an account of wool distributed to relatives of Šilwa-Teššub and to craftsmen (see Table 16.1). HSS 13 274 (AdŠ 80) records oil expenses for the family of the prince and wool given to craftsmen. In both texts wool is handed over to bow manufacturers:

- Three *kuduktu* (HSS 13 245: 8) = c. 1992 g
- Four minas for each of the two bow manufacturers (HSS 13 274: 7–8) = c. 2000 g

If these deliveries correspond to regular amount for the work assignment of the bow makers, this gives a supplementary argument for a *kuduktu* being equivalent to 80 shekels. The same conclusion may be drawn from JEN 128 and RATK 29 (see § 3.4).

Abbreviations

ASOR The American Schools of Oriental Research (New Haven)
 AAS Archiv des Šilwa-Teššup
 AD The Assyrian Dictionary of the Oriental Institute of the University of Chicago
 ARM Archives royales de Mari
 E Excavations at Nuzi
 HSA Harvard Semitic Series
 JEN Joint Expedition with the Iraq Museum at Nuzi
 RKT Rechtsurkunden und administrative Texte aus Kurruhanni
 SCCNH Studies on the Civilization and Culture of Nuzi and the Hurrians.

Bibliography

- Andersson Strand, E. and Cybulska M. (2013) Visualizing Ancient Textiles: How to Make a Textile Visible on the Basis of an Interpretation of an Ur III Text. In M. L. Nosch, H. Koefoed and E. Andersson Strand (eds), *Textile Production and Consumption in the Ancient Near East: Archaeology, Epigraphy, Iconography*, 113–127. Ancient Textiles Series 12. Oxford.
- Abrahami, P. and Lion, B. (2012a) Remarks to W. Mayer's Catalogue of the Nuzi Palace Texts. *Cuneiform Digital Library Bulletin* 2012/1, 1–7.
- Abrahami, P. and Lion, B. (2012b) Nuzi Notes 80. In P. Abrahami and B. Lion (eds), *The Nuzi Workshop at the 55th Rencontre Assyriologique Internationale (July 2009, Paris)*, 205–258. SCCNH 19. Bethesda Maryland.
- Abush, T. (1981) Notes on a Pair of Matching Texts: A Shepherd's Bulla and an Owner's Receipt. In M. A. Morrison and D. I. Owen (eds), *Studies on the Civilization and Culture of Nuzi and the Hurrians in Honor of Ernest R. Lacheman on his Seventy-Fifth Birthday April 29, 1981*, 1–9. Winona Lake Indiana.
- Archi, A. (1993) Trade and Administrative Practice: The Case of Ebla. *Altorientalische Forschungen* 20, 43–58.
- Astour, M. C. (1987) Semites and Hurrians in Northern Transjordan. In D. I. Owen and M. A. Morrison (eds), *General Studies and Excavations at Nuzi* 9:1. 3–68. SCCNH 2. Winona Lake Indiana.
- Böhl F. M. T. (1934) *Mededeelingen uit de Leidsche Verzameling van Spijkerschrift-Inscripties*, II, *Oorkonden uit de Periode van 2000–1200 v. Chr.*, *Mededeelingen der koninklijke Akademie van Wetenschappen, Afdeling Letterkunde*. Deel 78, Serie B, no. 2. Amsterdam.
- Breniquet, C. (2008) *Essai sur le tissage en Mésopotamie. Des premières communautés sédentaires au milieu du III^e millénaire av. J.-C.* Travaux de la Maison René-Ginouvès 5. Paris
- Cancik-Kirschbaum, E. (1999) ¹⁰āpi'u/sēpū. Eine akkadische Berufsbezeichnung aus dem Bereich der Textilherstellung. In Barbara Böck, Eva Cancik-Kirschbaum, Thomas Richter (eds), *Munuscula Mesopotamica. Festschrift für Johannes Renger*, 79–93. AOAT 267. Münster.
- Cardon, D. (2007) *Natural Dyes*. London
- Cassin, E. (1959) Le bain des brebis. *Orientalia* 28, 225–229.
- Cassin, E. and Glassner, J.-J. (1977) *Anthroponymie et anthropologie de Nuzi, volume 1, Les anthroponymes*. Malibu.
- Chow, W. W. K. (1973) *Kings and Queens of Nuzi*, Brandeis University, PhD. Ann Arbor, Michigan.
- Cohen, M. E. (1993) *The Cultic Calendars of the Ancient Near East*. Bethesda, Maryland.
- Cross, D. (1937) *Movable Property in the Nuzi Documents*. American Oriental Series 10. New Haven, Connecticut.
- Dalley, S. (1991) Ancient Assyrian Textiles and the Origins of Carpet Design. *Iran Journal of the British Institute of Persian Studies* 29, 117–135.
- Deller, K. (1985) *kurru* 'Mehlbrei'. *Orientalia* 54, 327–330.
- Deller, K. (1987) Review of H. Freydank *Mittelassyrische Rechtsurkunden und Verwaltungstexte*

- II. *Archiv für Orientforschung* 34, 58–66.
- Deller, K. and Mayer W. R. and Oelsner J. (1989) Akkadische Lexikographie: CAD Q. *Orientalia* 58, 255–282.
- Durand, J.-M. (1998) *Les documents épistolaires du palais de Mari*. LAPO 17. Paris.
- Durand, J.-M. (2009) *La nomenclature des habits et des textiles dans les textes de Mari*. Archives royales de Mari XXX. Paris.
- Eichler, B. (1973) *Indenture at Nuzi: The Personal Tidenūtu Contract and its Mesopotamian Analogues*. Yale Near Eastern Researches 5. New Haven, London.
- Fadhil, A. (1972) *Rechtsurkunden und administrative Texte aus Kurruhani*. Heidelberg.
- Fadhil, A. (1983) *Studien zur Topographie und Prosopographie der Provinzstädte des Königreichs Arraphe*. Baghdader Forschungen 6. Mainz.
- Fincke, J. (1993) *Die Orts- und Gewässernamen der Nuzi-Texte*. Répertoire géographique des textes cunéiformes 10, Wiesbaden.
- Fincke, J. (1999) The Nuzi Collection of the Harvard Semitic Museum. In D. I. Owen and G. Wilhelm (eds), *Nuzi at Seventy-Five*, 12–24. SCCNH 10. Bethesda Maryland.
- Fincke, J. (2002) Excavations at Nuzi 10/3, 175–300. In D. I. Owen and G. Wilhelm (eds), *General Studies and Excavations at Nuzi 10/3*, 169–304. SCCNH 12. Bethesda Maryland.
- Fincke, J. (2010) Zum Verkauf von Grundbesitz in Nuzi. In J. Fincke (ed.), *Festschrift für Gernot Wilhelm*, 125–141. Dresden.
- Fincke, J. (2012) Adoption of Women at Nuzi. In P. Abrahami and B. Lion (eds), *The Nuzi Workshop at the 55th Rencontre Assyriologique Internationale (July 2009, Paris)*, 119–140. SCCNH 19. Bethesda Maryland.
- Freydank, H. (1994) *Mittelassyrische Rechtsurkunden und Verwaltungstexte* III. Wissenschaftliche Veröffentlichung der Deutschen Orient-Gesellschaft 92. Berlin.
- Gadd, C. J. (1926) Tablets from Kirkuk. *Revue d'assyriologie* 23, 49–161.
- Gaspa, S. (2013) Textile Production and Consumption in the Neo-Assyrian Empire. In M. L. Nosch, H. Koefoed and E. Andersson Strand (eds), *Textile Production and Consumption in the Ancient Near East: Archaeology, Epigraphy, Iconography*, 224–247. Ancient Textiles Series 12. Oxford.
- Gelb, I. J. and Purves, P. M. and MacRae, A. A. (1943) *Nuzi Personal Names*, Chicago.
- Gordon, C. H. and Lacheman, E. R. (1938) The Nuzu Menology. *Archiv Orientalni* 10, 51–64.
- Graslin-Thomé, L. (2009) *Les échanges à longue distance en Mésopotamie au Ier millénaire. Une approche économique*. Orient et Méditerranée 5. Paris.
- Greenfield, J. (1960) 'Le bain des brebis'. Another Example and a Query. *Orientalia* 29, 98–102.
- Grosz, K. (1981) Dowry and Brideprice in Nuzi. In M. A. Morrison and D. I. Owen (eds), *Studies on the Civilization and Culture of Nuzi and the Hurrians in Honor of Ernest R. Lacheman on his Seventy-Fifth Birthday April 29, 1981*, 161–182. Winona Lake, Indiana.
- Grosz, K. (1988) *The Archive of the Wullu Family*. The Carsten Niebuhr Institute of Ancient Near Eastern Studies Publications 5. Copenhagen.
- Jakob, S. (2003) *Mittelassyrische Verwaltung und Sozialstruktur Untersuchungen*. Cuneiform Monographs 29. Leiden, Boston.
- Jankowska, N. B. (1969) Communal Self-Government and the King of the State of Arrapha. *JESHO* 12, 233–282.
- Jankowska, N. B. (1981) Life of the Military Elite in Arraphe. In M. A. Morrison and D. I. Owen (eds), *Studies on the Civilization and Culture of Nuzi and the Hurrians in Honor of Ernest R. Lacheman on his Seventy-Fifth Birthday April 29, 1981*, 195–201. Winona Lake, Indiana.
- Kraus, F. R. (1966) *Staatliche Viehhaltung im altbabylonischen Lande Larsa*. Amsterdam.
- Lacheman, E. R. and Owen D. I. (1981) Texts from Arrapha and from Nuzi. In M. A. Morrison and D. I. Owen (eds), *Studies on the Civilization and Culture of Nuzi and the Hurrians in Honor of Ernest R. Lacheman on his Seventy-Fifth Birthday April 29, 1981*, 377–432. Winona Lake, Indiana.
- Lacheman, E. R. and Owen D. I. (1995) Texts in the Harvard Semitic Museum. In E. R. Lacheman and D. I. Owen (eds), *Excavations at Nuzi 9:3*, 87–357. SCCNH 5. Winona Lake, Indiana.
- Lambert, M. (1960) A propos du bain des brebis. *Revue d'assyriologie* 54, 88.
- Landsberger, L. (1967) Über Farben im Sumerisch-Akkadischen. *Journal of Cuneiform Studies* 21, 139–173.
- Lewy, H. (1959) Miscellanea Nuziana. *Orientalia* 28, 1–25.

- Lion, B. (1999) Les archives privées d'Arrapha et de Nuzi. In D. I. Owen and G. Wilhelm (eds), *Nuzi at Seventy-Five*, 35–62. SCCNH 10. Bethesda Maryland.
- Lion, B. (2001) *L'archive de Pašši-Tilla fils de Pula-Hali. Une famille de financiers du royaume d'Arrapha au XIV s. av. J.-C.* SCCNH 11. Bethesda Maryland.
- Lion, B. (2004) Les adoptions d'hommes à Nuzi. *Revue historique de droit français et étranger* 82, 537–575.
- Lion, B. and Sauvage, M. (2005) Les textes de Nuzi relatifs aux briques. In D. I. Owen and G. Wilhelm (eds), *General Studies and Excavations at Nuzi* 11/1, 57–100. SCCNH 15. Bethesda Maryland.
- Maidman, M. P. (1979) A Nuzi Private Archive: Morphological Considerations. *Assur* 1/9, 179–186.
- Maidman, M. P. (1999) JEN 781–789: The Text Editions. In D. I. Owen and G. Wilhelm (eds), *Nuzi at Seventy-Five*, 329–373. SCCNH 10. Bethesda Maryland.
- Maidman, M. P. (2003) *Joint Expedition with the Iraq Museum at Nuzi 8. The Remaining Major Texts in the Oriental Institute of the University of Chicago.* In D. I. Owen and G. Wilhelm (eds), SCCNH 14. Bethesda Maryland.
- Maidman, M. P. (2009) JEN 799: The Text Edition. In G. Wilhelm (ed.), *General Studies and Excavation at Nuzi 11/2 in Honor of David I. Owen on the Occasion of his 65th Birthday October 28*, 287–298. SCCNH 18. Bethesda Maryland.
- Maidman, M. P. (2010) *Nuzi Texts and Their Uses as Historical Evidence.* Writings from the Ancient World 18. Atlanta.
- Maidman, M. P. (2011) Nuzi. The Club of the Great Powers, and the Chronology of the Fourteenth Century. *Kaskal* 8, 78–139.
- Mayer, W. (1977) Mardatu 'Teppich'. *Ugarit Forschungen* 9, 173–189.
- Mayer, W. (1978) *Nuzi-Studien I. Die Archive des Palastes und die Prosopographie der Berufe.* AOAT 205/1. Neukirchen-Vluyn.
- Mayer, W. (1981) Beiträge zum hurro-akkadischen Lexicon II. In M. A. Morrison and D. I. Owen (eds), *Studies on the Civilization and Culture of Nuzi and the Hurrians in Honor of Ernest R. Lacheman on his Seventy-Fifth Birthday April 29, 1981*, 247–255. Winona Lake Indiana.
- Mc Adams, C. R. (2006) Shepherds at Umma in the Third Dynasty of Ur. *Journal of the Economic and Social History of the Orient* 49:2, 133–169.
- Michel, C. and Veenhof, K. R. (2010) The Textiles Traded by the Assyrians in Anatolia (19th–18th Centuries BC). In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennium BC*, 210–271. Ancient Textiles Series 8. Oxford.
- Millard, A. R. (1981) Stray from a 'Nuzi' Archive. In M. A. Morrison and D. I. Owen (eds), *Studies on the Civilization and Culture of Nuzi and the Hurrians in Honor of Ernest R. Lacheman on his Seventy-Fifth Birthday April 29, 1981*, 433–441. Winona Lake Indiana.
- Morrison, M. A. (1981) Evidence for Herdsmen and Animal Husbandry in the Nuzi Documents. In M. A. Morrison and D. I. Owen (eds), *Studies on the Civilization and Culture of Nuzi and the Hurrians in Honor of Ernest R. Lacheman on his Seventy-Fifth Birthday April 29, 1981*, 257–296. Winona Lake Indiana.
- Morrison, M. A. (1993) The Eastern Archives of Nuzi: An Overview. In M. A. Morrison and D. I. Owen (eds), *The Eastern Archives at Nuzi and Excavations at Nuzi* 9/2, 3–130. SCCNH 4. Winona Lake, Indiana.
- Müller, G. G. W. (1994) *Studien zur Siedlungsgeographie und Bevölkerung des mittleren Osttigrisgebietes.* Heidelberger Studien zum Alten Orient 7. Heidelberg.
- Müller, G. G. W. (1998) *Londoner Nuzi-Texte.* SANTAG Arbeiten und Untersuchungen zur Keilschriftkunde 4. Wiesbaden.
- Negri Scafa, P. (2012) Petites archives familiales de Nuzi trouvées au nord du palais. In P. Abrahami and B. Lion (eds), *The Nuzi Workshop at the 55th Rencontre Assyriologique Internationale (July 2009, Paris)*, 205–258. SCCNH 19. Bethesda Maryland.
- Negri Scafa, P. (2009) Administrative Procedures in the Texts from the House of Zike, Son of Ar-Tirwi, Nuzi. In G. Wilhelm (ed.), *General Studies and Excavations at Nuzi* 11/2, 437–477. SCCNH 18. Bethesda Maryland.
- Ochsenschlager, E. L. (1993) Sheep: Ethnoarchaeology at Al-Hiba. *Bulletin on Sumerian Agriculture* 7, 33–42.

- Oppenheim, L. (1936) Die nichtsemitischen Monatsnamen der Nuzi-Texte. *Archiv Orientalní* 8, 290–305.
- Pedersen, O. (1998) *Archives and Libraries in the Ancient Near East, 1500–300 BC*, 15–32. Bethesda.
- Pfeiffer, R. H. and Speiser E. A. (1936) *One Hundred New Selected Nuzi Texts*. Annual of the American Schools of Oriental Research 16. Baltimore, Maryland.
- Pfeifer, C. (2009) Das Eherecht in Nuzi: Einflüsse aus altbabylonischer Zeit. In G. Wilhelm (ed.), *General Studies and Excavation at Nuzi 11/2 in Honor of David I. Owen on the Occasion of his 65th Birthday October 28*, 355–420. SCCNH 18. Bethesda Maryland.
- Postgate, J. N. (1986) Middle Assyrian Tablets: The Instrument of Bureaucracy. *Altorientalische Forschungen* 13/1, 10–39.
- Postgate, J. N. (2000) Assyrian Felt. In P. Negri Scafa and P. Gentili (eds), *Donum Natalicium: Studi in onore di Claudio Saporetti in occasione del suo 60e compleanno*, 213–217. Roma.
- Postgate, J. N. (2001) System and Style in Three Near Eastern Bureaucracies. In S. Voutsaki and J. T. Killen (eds), *Economy and Politics in the Mycenaean Palace States*, 181–194. Cambridge Philological Society. Supplementary Volume 27. Cambridge.
- Postgate, J. N. (2003) Documents in Government Under the Middle Assyrian Kingdom. In M. Brosius (ed.), *Ancient Archives and Archival Traditions: Concepts of Record-keeping in the Ancient World*, 124–138. Oxford.
- Postgate, J. N. and Payne, S. (1975) Some Old Babylonian Shepherds and their Flocks, *Journal of Semitic Studies* 20:1, 1–21.
- Röseler, I. (1999) Hurritologische Miszellen. In D. I. Owen and G. Wilhelm (eds), *Nuzi at Seventy-Five*, 393–400. SCCNH 10. Bethesda Maryland.
- Rougemont, F. (2011) Oil at Nuzi and in the Linear B Records. *Ugarit-Forschungen* 43, 345–410.
- Rougemont, F. (in press) Les allocations de laine à Nuzi et dans le monde mycénien. Premier essai de comparaison. In P. Carlier and F. Joannès (eds), *Palatial Economy in the Ancient Near East and in the Aegean: First Steps Towards a Comprehensive Study and Analysis*.
- Ryder, M. L. (1993) Sheep and Goat Husbandry with Particular Reference to Textile Fibre and Milk Production. *Bulletin on Sumerian Agriculture* 7, 9–32.
- Schneider-Ludorff, H. (1998) Filz in Nuzi? In D. I. Owen and G. Wilhelm (eds), *General Studies and Excavations at Nuzi* 10:2, 163–168. SCCNH 9. Bethesda Maryland.
- Schneider-Ludorff, H. (2002a) Das Mobiliar nach den Texten von Nuzi. In D. I. Owen and G. Wilhelm (eds), *General Studies and Excavations at Nuzi* 10:3, 115–149. SCCNH 12. Bethesda Maryland.
- Schneider-Ludorff, H. (2002b) Mit einem ‘Sonnensymbol’ auf die Weide? Bemerkungen zu den Eigentumsmarkierungen von Tieren. In D. I. Owen and G. Wilhelm (eds), *General Studies and Excavations at Nuzi* 10:3, 151–157. SCCNH 12. Bethesda Maryland.
- Schuster-Brandis, A. (2008) *Steine als Schutz-und Heilmittel. Untersuchungen zu ihrer Verwendung in der Beschwörungskunst Mesopotamiens im 1. Jt. V. Chr.* AOAT 46. Münster.
- Schwartz, J. (1960) Note sur le bain des brebis. *Orientalia* 29, 102.
- Scurlock, J. (2008) On Some Terms for Leatherworking in Ancient Mesopotamia. In R. D. Biggs, J. Myers and M. Roth (eds), *CRR 51*, 171–176. SAOC 62. Chicago Illinois.
- Smith, J. S. (2013) Tapestries in the Bronze and Early Iron Age of the Ancient Near East. In M.-L. Nosch, H. Koefoed and E. Andersson Strand (eds), *Textile Production and Consumption in the Ancient Near East: Archaeology, Epigraphy, Iconography*, 161–188. Ancient Textiles Series 12. Oxford.
- Spring, B. (2005) Excavations at Nuzi 11/1, 1–60. In D. I. Owen and G. Wilhelm (eds), *General Studies and Excavations at Nuzi* 11:1, 201–251. SCCNH 15. Bethesda Maryland.
- Stein, D. (1993a) *Das Archiv des Šilwa-Teššup Heft 8. The Seals Impressions (Text)*. Wiesbaden.
- Stein, D. (1993b) *Das Archiv des Šilwa-Teššup Heft 9. The Seals Impressions (Catalogue)*. Wiesbaden.
- Steinkeller, P. (1995) Sheep and Goat Terminology in Ur III Sources from Drehem. *Bulletin on Sumerian Agriculture* 8, 49–70.
- Tsukimoto, A. (1985) *Untersuchungen zur Totenpflege (kispum) im alten Mesopotamien*. AOAT 216. Neukirchen-Vluyn.
- Van De Mieroop, M. (1993) Sheep and Goat Herding According to the Old Babylonian Texts from Ur. *Bulletin on Sumerian Agriculture* 7, 161–182.
- Van Driel, G. (1993) Neo-Babylonian Sheep and Goats. *Bulletin on Sumerian Agriculture* 7, 219–

- Van Driel, G. and Nemet-Nejat, K. R. (1994) Bookkeeping Practices for an Institutional Herd at Eanna. *Journal of Cuneiform Studies* 46, 47–58.
- Van Soldt, W. H. (1990) Fabrics and Dyes at Ugarit. *Ugarit Forschungen* 22, 321–357.
- Waetzoldt, H. (1972) *Untersuchungen zur neusulterischen Textilindustrie*. Roma.
- Wilhelm, G. (1970) *Untersuchungen zum Hurro-Akkadischen von Nuzi*. AOAT 9. Neukirchen-Vluyn.
- Wilhelm, G. (1980) *Das Archiv des Šilwa-Teššup Heft 2. Rationen Listen I*. Wiesbaden.
- Wilhelm, G. (1985) *Das Archiv des Šilwa-Teššup Heft 3. Rationen Listen II*. Wiesbaden.
- Wilhelm, G. (1988) Zu den Wollemaßen in Nuzi. *Zeitschrift für Assyriologie* 78, 276–283.
- Wilhelm, G. (1995) Bit papāhi in Nuzi. In D. I. Owen and G. Wilhelm (eds), *Edith Porada Memorial Volume*, 121–128. SCCNH 7. Bethesda Maryland.
- Zaccagnini, C. (1975) Review of *Cuneiform Texts from Babylonian Tablets in the British Museum, Part 5. Edited by C. B. F. Walker*. London 1971. *Oriens Antiquus* 14, 85–88.
- Zaccagnini, C. (1977) The Merchant at Nuzi. *Iraq* 39, 171–189.
- Zaccagnini, C. (1981) A Note on Nuzi Textiles. In M. A. Morrison and D. I. Owen (eds), *Studies on the Civilization and Culture of Nuzi and the Hurrians in Honor of Ernest R. Lacheman on his Seventy-Fifth Birthday April 29, 1981*, 349–360. Winona Lake Indiana.
- Zaccagnini, C. (1990a) The Nuzi Wool Measures Once Again. *Orientalia* 59, 312–319.
- Zaccagnini, C. (1990b) Again on the Yield of the Fields at Nuzi. *Bulletin of Sumerian Agriculture* 5, 201–217.
- Zaccagnini, C. (1999–2001) The Mina of Karkemiš and Other Minas. *State Archives of Assyria Bulletin* 13, 39–56.
- Zaccagnini, C. (2003) Nuzi. In R. Westbrook (ed.), *A History of Ancient Near Eastern Law Vol. I*, 565–617. Handbook of Oriental Studies 72:1. Leiden Boston.
- Zawadzki, S. (2002) Payment in Wool in the Economy of the Ebabbar Temple at Sippar. *Revue d'Assyriologie* 96, 149–167.

1 For the history of excavation, see Stein 1993a, 13–15 and Fincke 1999, 13–17.

2 See Maidman 2011, 77–139 and more specifically pp. 124–126 where it is suggested that the Assyrian attack occurred entirely within Aššur-uballit's first decade. Stein 1999, 19 considers a somewhat broader time span for the Nuzi archive (c. 1440–1330 BC).

3 For an overview of the family archives according to their findspots and contents, see Pedersén 1998 and Lion 1999.

4 Maidman 1979.

5 For the text types within this archive, see Stein 1999, 37–72.

6 Mayer 1978. For additional references and corrections to Mayer's catalogue of the palace texts, see Abrahami and Lion 2012.

7 For a comparative approach between Mycenaean and Nuzi evidence on wool, see Rougemont, in press. The absolute values of the units of measure used in the present paper, are found below in the appendix. The rooms where the tablets were found are indicated in parenthesis after the text reference. Collations of some of the Palace texts (marked with *) presented in the present study, were made by B. Lion and myself during our three stays (2009–2011) at the Harvard Semitic Museum in the frame of the program *Édition électronique de textes cuneiformes de Nuzi: les archives du palais (XIV^e s. av. J.-C.)* which was made possible by the generous funding of the Rhône-Alpes Regional Council. P. Steinkeller, Curator of Cuneiform Collection allowed us access to the tablets, and J. A. Greene, Assistant Director and his team, facilitated our work at the museum. I would like to thank them for this. I also express my thanks for their careful reading and their valuable remarks to C. Breniquet, C. Michel, B. Lion and R. Firth who also corrected the English. Of course, any remaining mistakes or misunderstandings are my own responsibility.

8 Morrison 1981, 267–268. For Ur III period, see Mc Adams 2006, 149–158; as regard Old Babylonian times, see the general picture drawn by Kraus 1966; Postgate and Payne 1975 and Postgate 2001, 187–190. Concerning the collection of wool in Middle Assyrian sources, see Jakob 2003, 369–373. Neo-Babylonian documentation has been studied by Van Driel 1993 and Van Driel and Nemet-Nejat 1994.

9 Morrison 1981, 269–270. Most of the consignment tablets presented in this study originate from Šilwa-Teššub's archive, except HSS 16 266 (F24) and 311 (S129), see p. 292 for the list of texts. Supplementary herding consignments provided by this archive are found in Stein 1993a, 145: HSS 14 583 (AdŠ 283); AdŠ 287; AdŠ 290; HSS 16 277 (AdŠ 304); AdŠ 309; HSS 16 273 (AdŠ 312); HSS 16 294 (AdŠ 313); AdŠ 314; AdŠ 710 published as EN 11/1 59, see Spering 2005, 250 and EN 9/3 476, see

Lacheman and Owen 1995, 131 and 478. For other herding consignments, see YBC 5132 (Lacheman and Owen 1981, 393–394 no. 13) and WHM 170489 in Millard 1981, 440.

10 Morrison 1981, 270 and 284.

11 Morrison 1993, 61 for translation.

12 Cross 1937, 29.

13 His salary for taking care of the flock might have consisted of one lamb if we assume that each animal ‘borrowed’ by him gave birth to one lamb. In case of payment in wool, the three *kuduku* reflects only part of the expected yield of the returned sheep, see below § 1.2.4. Note that in HSS 5 96 (A 34), Haniyu, with his brother Alkiya is also involved in animal transaction with Šuriha-ilu, see § 1.2.3.

14 Abush 1981; Stein 1993a, 43 and 147 for the list of texts mentioning counting stones in the Šilwa-Teššub archive.

15 Morrison 1981, 268.

16 An expression already found in Old Babylonian texts, see Kraus 1966, 13–14 and Van De Mieroop 1993, 167. The verb ‘to give’ is also attested, see HSS 14 627: 7 (AdŠ 410).

17 L. 1–7: 12 udu-meš-munus, *ša šu mši-la-hi lú sipa, mel-hi-ip-til-la, gar-é ša uru nu-zí, ib-ta-qa-šu-nu-ti*, Rev(Seal impression). na₄ mši-la-hi. The *šakin bití* plays a central role in the economy of the palace as an authority in charge of controlling movements of commodities and personal. For a description of his administrative attributions, see Lion and Sauvage 2005, 62. For similar receipts sealed by shepherds recording the flocks that were ‘entered for plucking’, see Böhl 1934, 44 (n°915), Gadd 1926, 139 (no. 77) and SANTAG 4 12 in Müller 1998, 52–53.

18 For a discussion of the term *muttū*, see Postgate 1986, 38; Stein 1993a, 46 and Negri Scafa 2009, 445–450.

19 They are much less common than the ‘*muttū*’ texts recording the animals owed by the shepherd, see Morrison 1981, 294–295. In some cases it is possible to find a match between ledgers of ‘deficit’ and the corresponding individual acknowledgements of ‘deficit’, see Stein 1993a, 146 sub B.

20 L. 1–7: 4 udu-munus ù-tu-meš gal-meš 6 ka₄-lu-mu-meš 1 udu-nita 2-ni-šu bá-aq-nu, mu-un-tù-[šu], *ša mha-na-a-a dumu a-pa-a-a, i-na bu-qú-ni ú-še-ra-bá, i-na na₄-meš-ti, la na-du-ú*, Rev(Seal impression), na₄ mha-na-a-a dumu a-pa-a-a. For the seal impression, see Stein 1993b, 200 n°169. Similar texts are: HSS 16 258 (AdŠ 390) and HSS 16 289 (AdŠ 390). Some variants of this wording may be noted. HSS 13 335 (AdŠ 339) omits the ‘entering’ clause however the flocks are qualified as unplucked. In HSS 16 289 (AdŠ 390), the person bearing the obligation to ‘enter for plucking’ is Wiriš-tanni, one of Šilwa-Teššub’s household managers (*inkaru*). In view of the parallel texts, l. 4 of this text is better restored as [a-na bu-qú-ni ú-še-ra-ba. For the corresponding ledgers recording the number of unplucked flocks from individual herdsmen, see for instance HSS 16 272 (AdŠ 416).

21 These tablets are not sealed. They represent internal working documents issued by the administration for its proper use. Postgate 2003, 130 defines this type of documents as unilateral. By contrast ‘bilateral documents’ are records which acknowledge an obligation by the side who seals the tablet.

22 L. 1–11: 3 udu-munus ù-tu, 6 ka₄-lu-mu nita-meš, *ša mqa-ni-e*, 7 udu-nita-meš gal-meš, 4 ka₄-lu-mu nita-meš 1-nu ba-aq-nu, *ša mwa-ra-te-e*, 20 udu-munus ù-tu-meš 20 udu gal-meš, 6 ka₄-lu-mu nita-meš 4 ka₄-lu-mu munus-meš, (Lo) šu-nigin 70 udu-meš, *ša mwa-[an]-ti-ia*, (Rev.) [tup]-pu *ša bu-qú-ni*. Note that this Wantiya is not necessarily the same individual as Wantia son of Wiriš-tanni mentioned in HSS 13 56 (AdŠ 371), see Morrison 1981, 264 n. 64 and p. 291. It is difficult to say if his father is to be identified as the Wiriš-tanni known as a household manager (*inkaru*) who seals HSS 16 289 (AdŠ 391), see n. 20.

23 HSS 13 487: “Total of 308 plucked sheep, 106 goats”; HSS 16 244 (AdŠ 413) and HSS 16 247 (AdŠ 412) are concerned respectively with 955 and 146 sheep which were “plucked at plucking (time)” (*ša buqūni baqnū*). Note in HSS 16 247, the mention of 73 goats with no reference as to the shearing as in HSS 13 487.

24 L. 1–3: *síg-meš udu-munus-meš, ša mna-i-še-ri, ù ša mku-um-mi-ia*, see SANTAG 4 49 in Müller 1998, 122. Naišeri and Kummīya are both known as shepherds.

25 Morrison 1981, 267 n. 79. The forms *buqūmu* and *baqāmu* are mostly found until Old Babylonian times, see CAD B, 97–99 and 325–326. Note the two instances in the Nuzi texts concerning hides of sheep (HSS 13 341 = AdŠ 456) or goat hair (HSS 15 219 = AdŠ 495) described as *šarha*. The verb *šarāhu* B is poorly attested and not clearly understood: ‘to pluck’, ‘to mark (?)’, see CAD Š/3, 40; ‘herausziehen’, ‘auswählen’, see AHW 1183b. In HSS 13 341 (AdŠ 456), the ‘plucked?’ hides are also qualified by the hapax *šurira*, see CAD Š/3 349 and AHW 1284a. For wool collected from hides, see §2.1.

26 L. 13–16: 3 udu-nita-meš *ša 2[šu bá-aq-nu, 1 udu]-munus-meš ša 2-šu bá-aq-nu, [1] en-zu munus-meš 2-šu ga₅-az-zu, 2 en-zu nita ša 2-šu ga₅-az-zu*, see Müller 1998, 141–144.

27 Ryder 1993, 14–15. *Baqānu* is said exceptionally of goats, see HSS 16 255 (AdŠ 354) where three buck-kids ‘one time plucked’ are recorded as owed by Ehli-pu son of Artā.

- 28 They are few occurrences of lambs one or two times plucked (sila₄ AŠ-ur₄ and si-2-lá) in Ur III and Old Babylonian documentation, see Van De Mieroop 1993, 162–163 and Steinkeller 1995, 56.
- 29 Three times plucked occurs in: EN 10/3 179 (see Fincke 2002, 174 and 210), a loan contract of a male sheep; see also HSS 9 106: 13 and HSS 9 100: 10. Both texts concern a loan of barley and a “three times plucked ewe with her wool”. Ewes, three and four times plucked are mentioned in HSS 5 38: 4. The highest number is 5 times plucked which occurs in the *tidennūtu* loan contract EN 9/2 267, see Lion 2001, 94–96. For this type of loan, see n.144.
- 30 Ryder 1993, 17, doubts that “lambs born in autumn can be plucked at six months old, in their first spring, since moulting completes a rest stage begun in autumn”. Van De Mieroop 1993, 163 considers that the lambs were 16–17 months old at their first plucking. For the age of the animal at its first plucking, see also Müller 1998, 53.
- 31 According to the dictionaries, the rarely attested word *šimtu* ‘plucked wool’ is also documented by a single occurrence in HSS 14 520: 30 (30 ma-na *ši-in-TUM* 25 ma-na [...]), see CAD Š/3, 20; AHw 1239b and n. 67. The text is a palace inventory recording metallic utensils, furniture and fabrics. As TUM has the current value tu₄, this occurrence might refer to the word *šimtu* ‘glue’/‘varnish’ (CAD Š/3, 9), which also fits its position in the list between the furniture and the fabrics. *Šimtu* represents also a ‘mark’ made on animals or hides (CAD Š/3, 10), a meaning that doesn’t match the context. For animal marking in the Nuzi texts, see Schneider-Ludorff 2002b.
- 32 *Muštu* = ^gga-ríg, the most common word for comb is linked to an implement used for wool although only attested as a lexical entry: ^gga-ríg-síg = *ša šipāti*, see CAD M/2: 290a. The fact that the shearing was done with a knife is suggested by the equivalence *magzazu* = GIR₂, see CAD M/1: 49. Evidence of wool collected with the *arītu* knife (siki gir-gul) is also found in the Ur III corpus, see Steinkeller 1995, 57 and also Waetzoldt 1972, 53–55, who shows that siki gir-gul is wool removed with a knife from dead sheep. In Neo-Babylonian texts, the shearing is operated with the *širpu*, see Van Driel 1993, 228.
- 33 Cassin 1959.
- 34 For the archive of Kel-Teššub, see Jankowska 1981, 197.
- 35 *Iaratu* is a Nuzi by-form of Ayyaru, see Cohen 1993, 309–310.
- 36 L.7–11: ù 1 udu-munus sigs, *ša 2 bá-aq-nu ina iti-hi ia-ra-ti, i-na-an-din šum-ma udu a-na a-meš, ú-ra-du ti-ti k[a*-[l]u*-[m]a*-šu, i-na-an-din*. Cassin read *ka₄-[lu-m]i(?)*-šu*. But she wasn’t completely certain as Chiera’s copy suits more a *ma* sign than a *mi*. Collation of the corresponding line using a photo indicates that the traces actually correspond better to a *ma*. W. Farber, curator of the Oriental Institute of the University of Chicago, allowed my student V. Patai to take a photo of the tablet. I would like to take this opportunity to thank both of them. For transfer of ewes and goats with their lamb / kid, see for instance the *tidennūtu* loan transaction JEN 606, 5–7.
- 37 Edited as no. 852 in Durand 1998, 671–674.
- 38 L. 8: udu-meš *li-ra-mi-[k]a-ma šu-ub-qí-im*.
- 39 L.37–38: udu-meš *iš-tu u₄-mi ma-du-tim ru-um-mu-ka-ma sig ša udu-meš i-ša-hu-[h]a*. Note that *šahāhu* ‘fall out’ is said also of hair (CAD Š/1, 75–76). The Mari letter offers the single occurrence in connection with wool. ‘The wool is curling’ as translated in Durand’s edition, is not appropriate.
- 40 Ryder 1993, 15 and Breniquet 2008, 108.
- 41 After Cassin’s paper, other textual occurrences of this practice were drawn to attention: Greenfield 1960 in Aramaic texts, and in ancient Egypt by Schwartz 1960, 102. Two documents of Uru-KA-gina mentions this operation, see Lambert 1960, 88. Note that it is also attested in A. 3521, an unpublished Old Babylonian letter, see CAD R, 115a.
- 42 Morrison 1981, 269 n. 94. The argument to support this view is mainly drawn from the clustering of the herding contracts at the beginning of the year, see Postgate and Payne 1975, 4 and Van Driel 1993, 228–229. For the ethnoarchaeological observations from southern Iraq, see Ochsenschlager 1993, 36.
- 43 Except for EN 9/2 298 (S113) where the time for the return of the flock, by the beginning of month Imurtanni (March/April), is probably correlated to the plucking (see above § 1.1.1).
- 44 L. 22–24: Total 24 lambs plucked at spring time which are with the shepherds (*šu-nigín 24 ka₄-lu-mu-meš ša ti-ši bu-qú-ni-i a-šar lú-[meš re]-ia-ti ša aš-bu*).
- 45 Hinzuri and Kurilli designate the same month in the Nuzi calendar, see Mayer 1978, 218. Oppenheim already observed that this month occurred in context of plucking, see Oppenheim 1936, 297.
- 46 As already suggested by Gordon and Lacheman 1938, 55 n. 1.
- 47 L. 10–10a: 1 *ka₄-lu-mu nita hu-ra-pu ša bá-aq-nu, i-na itu-hi [ku]-ri-[il-li]*.
- 48 *terdennūti* ‘of second quality’ does not fit well in this context because l. 5, in the total, the animals are qualified as ‘good’ (sig₅). The CAD T, p. 227a translates ‘shear a second time?’ Cross 1937, 27, suggested that the word could be indicative of the number of plucking, i.e. ‘twice (plucked)’.
- 49 L. 14–19: ù udu-meš *i-na ugu-šu-nu, ú-lu-la-du, i-na lib-bi-šu-nu, ša aš-bu ʾmšu-ri-hi-an, i-ša-bat-sú-ma ù udu-meš ú-ma-al-[la]*. For a similar clause in animal loan contract, see EN 9/2 360 (Morrison 1993, 61)

and below § 3.4, JEN 128 and RATK 29. Haniyu is involved in another animal 'loan', see HSS 5 2 (34) from the same archive, see § 1.1.1. For *šaniāma našū* understood as 'to bear a second (fleece)', see CAD N/2, p. 95a.

50 L. 7–8: *i-na bú-qu-ni* ša?, itu-*hi ar-ka-pí-[in-ni]*. In Grosz 1988, 162–163; p. 120–121, the translation 'two bān of wool' is wrong (l. 4).

51 Archi 1993, 47.

52 Andersson Strand and Cybulska 2013, 115. and McAdams 2006, 152 (0.9 kg per sheep).

53 Van De Mieroop 1993, 172.

54 Kraus 1966, 143–145.

55 Durand 2009, 15.

56 Jakob 2003, 372.

57 Van Driel 1993, 222–223. Ryder 1993, 15 notes that "few primitive sheep today grow more than 1 kg of wool and so estimates of 1.3 kg for Sumerian rams (meaning that ewes would grow 1 kg) are realistic".

58 For the analysis of these texts, see Zaccagnini 1990b.

59 Note that the *tidennūtu* loan contracts in which sheep are borrowed are of no help in regard to this matter. Usually a specific clause stipulates that the animals have to be returned 'with their wool' (i.e. with the wool still on the animal) so that any indication as to the quantity of wool produced is missing, see for instance: HSS 9 100 (A 34): 9–10 and 16–17 where the commodities include grain and 1 ewe 3 times plucked 'with her wool' (síg-meš-šu / šī-pa-ti-šu); EN 9/1 197 (P382): 11–12 which concerns 18 minas of tin and 4 ewes 2 times plucked 'with (their) wool' (*itti* sīg). Other examples can be found in Gadd 1926, 88 no. 3: 27 and AASOR 16 66: 31 (S112). In this contract, the animal are borrowed and to be returned in the month named "the funerary offering (*kišpātu*) of *iškiki*" which is otherwise not attested. Gordon and Lacheman 1938, 55–56, n. 5 noted already that this month may have fallen before the plucking season; see also the discussion in Tsukimoto 1985, 105–106.

60 See Cross 1937, 11, 15, 48 who did not present any textual evidence.

61 Zaccagnini 1981, 355.

62 The name with this patronymic seems to occur only in this text.

63 L. 1–8 : 32 udu-meš *i*-na** šā-šu-nu, 8 udu ša bá-aq-nu, ù 16 ku-du-uk-ti sīg.meš, ša mdingi.sì-na dumu na-ik-ké, ša mah-rù ša 8 udu.meš, sīg.meš-šu-nu *i-na* ṭup-pa-ti, [š]a* mu-ul-li-i [a*-aṭ-ru], [...] ša [23] *[n?] [udu?] [...] (Revers not inscribed).

64 Wilhelm 1988, 278–279. Note that earlier, in Wilhelm 1980, 27, the author supports the two *kuduktu* per sheep on the basis of HSS 13 312.

65 According to Zaccagnini, Wilhelm's discussion of HSS 13 312 lead him to posit that one *kuduktu* of wool was the expected yield of a single sheep, see Zaccagnini 1990a, 313, 316 and Zaccagnini 1999–2001, 52. However, this view isn't expressed by Wilhelm in his paper.

66 The word is very rarely attested; see CAD N/2, 344a; AHw, 804b and CAD M/2, 187b. For this type of wool in Ur III texts, see Waetzold 1972, 56–57.

67 This was already noted by Cancik-Kirschbaum 1999, 83. The poor quality is also suggested by the Sumerian equivalent sīg-mug-(hul) in the lexical entries. *Šimtu* (see above n. 31) and *qerdu* (perhaps attested by a single occurrence at Nuzi, see HSS 9 3, see § 2.4), seems to correspond to wool obtained from dead animal, see Deller 1985, 327 and Deller, Mayer and Oelsner 1989, 262.

68 *ki nu-qa-ra-tu₄ i-ba-aq-qa-nu*.

69 L. 11–12 : 6 kuš udu [ša] bu-qu-ni^m [n-te-er-ta-a], a-na 1-en zi-a-[na-tu₄] a-na šu [NP...].

70 L. 11: [x] kuš udu ša bu-qu-ni and later in the text in lines 15, 19 and 21. Note that the number of hides in each delivery is not preserved. Based on HSS 15 170, one might restore '6'. However the number of hides per *zianātu* may slightly vary, see Schneider-Ludorff 1998, 164–165.

71 For the presentation of Kuši-harpe's file, see Maidman 2010, 81–84 and 100–101 for a new edition of the text.

72 Ipša-halu appears in a weaver list from the palace HSS 14 649 (= HSS 16 337).

73 CAD E, 238–240.

74 L. 1–11: 6 na-ri-ú, sīg-meš a-na šu-ti, luḡal-ku-ti, na-ad-nu, i-pu-šu, ^{LoEi}na uru dingir-meš, it-ti, ^{Revfi}ma-aš-tù, ni-is-sà-ak-ka₄-mu-um-ma, dù-meš-uš, (Seal impression), na₄ luḡal-ku-ti.

75 L. 17–18: sīg-meš ša òim i-bá-šā-ši ša dù.

76 Freydank 1994, 12 already noticed that the *sēpû* were involved in the production of felt from the fact that they used as raw materials hides, goat-hair and wool. See Postgate 2000, 217 and the extensive discussion in Cancik-Kirschbaum 1999, especially p. 87–89 for the etymology which bears the fundamental meaning of 'clumping'/'compressing'. Both scholars suggested *tahapšû*, probably of Hurrian origin, as a candidate for the word for felt (Postgate 2000, 215–216 and Cancik-Kirschbaum 1999, 87). For the felt-worker in Middle-Assyrian sources, see most recently Gaspa 2013, 232–233. In

her discussion of the word *zianātu*, generally identified as a blanket [a mattress would be more adequate according to ethnographic evidences, suggestion from C. Breniquet], Schneider-Ludorff 1998 has shown that it was a felted fabric. In her opinion, it may have been originally the word for 'felt' (p. 168). Because the middle sign *pf* has also the value *bi*, the reference in HSS 5 104, *sēpû* (*se-pf-e*), has been tied to *sēbû* (brewer / tavern keeper) by Mayer 1978, 178 and the dictionaries (CAD S, 7a 2' and AHw, 1000b). Deller 1987, 62–63 already recognized the word *sēpû* in HSS 5 104 but connected it to the profession of 'knacker'. None of the other three occurrences of 'brewer' (*sēbû*) in the Nuzi texts which come from lists of palace servants should be reinterpreted. This is suggested by a different spelling: the use of a SI in HSS 5 104 as against a ZI sign in HSS 14 593: 37; HSS 16 383: 2 and HSS 16 384, 5. Furthermore it should be noted that the *sēbû* in the list HSS 14 593, is placed outside the group of the textile artisans which includes weavers, *kāširu*-weavers and fuller. For the *kāširu*, see now Smith 2013, 171–172.

77 The link of this text with Enna-mati's archive is discussed by Fahdil 1983, 274.

78 *Uzzulikarû*, a word of Hurrian origin, is so far only attested in Nuzi. The meaning is unclear, see Wilhelm 1980, 161; AHw, 1449b: "jung, gut in Ordnung?" and CAD U/W, 396a. It is related to people and mostly designates women. The word is also used as a qualifier for the *zianātu* blanket and is well documented with furniture (table, chair and bed). Women of this group are mainly attested in the palace texts where they appear in distribution lists without any hints as to their occupation (see prosopography and commentaries in Mayer 1978, 151–152). In view of their position after the 'weaver of the thread', Schneider-Ludorff 2002a, 130 n. 118 has suggested that the *uzzulikarû* women were involved in textile production.

79 For this operation, see Breniquet 2008, 139; 159; 293 and Andersson Strand and Cybulska 2013, 120. For a possible use of oil for greasing the warp yarn, see HSS 13 302, § 2.5.2.

80 For *nasqu* 'sorted/selected', see CAD N/2, 30–31 and Waetzoldt 1972, 41 n. 22.

81 The meaning of *šūhiwe* is uncertain, see CAD Š/3, 147b. This Hurrian word is a hapax that may be understood on the basis of Akkadian lexical entries as either 'small' (*ṣehru*) or 'strong' (*dannutu*), see AHw, 1253b and p. 1232b.

82 The identification of this type of wool as 'combed wool' is based on the Sumerian equivalent in lexical lists *sig-ga-rig-ak*, see CAD P, 541–542. For *ga-rig* = comb, see n. 32. This implement might have been used for teasing wool (before spinning), if we follow Michel's understanding of the term *pušikku* as 'teased', see her paper in the present volume. Note that Mari texts suggest that *pušikku* wool is used for making canvas. Bed are also stuffed with it, see Durand 2009, 146, CAD Š/2, 267 and p. 363–364.

83 L. 1–24: [*a-na*] ^{me}el-li-pa-pu, *qī-bī-ma*, *um-ma* lugal-ma, *ku-ša-ti* ki-na-tu₄, *i-ip-pu-šu*, *mī-nu-um-me-e*, *nī-šu-ut* é gal-lī, *ša i + na*, *uru nu-zi aš-bu*, *lu-ú lú ú lu-ú munus*, 10 ta-àm gín [*pu*]-sī-ku, ^{LoEù} 10 ta-àm gín [*qē?-er*]/*du*, ^{Rev}[...] a lu ša, [...] gín *pu-sī-ku*, *ú 2 munus-meš*, *i + na be-ri-šu-nu*, [*šu*]-um-hī-ir-šu-nu-ti, *ha-mu-ut*]-tá, *i + na* *uru dingir-meš*, [*šu*]-bi-il-šu-nu-ti, [...] gín *pu-sī-ku ša*, [*ú-š*]e-e-bi-lu, [*ú*]-tīr, [*šu-bi-l*]a-aš-šu, ^{VpE}/na₄ ^m/tar-mi-te-šep (Seal impression). For an earlier edition, see Chow 1973, 140.

84 A list of terms related to dye and colour in the Nuzi texts is found in Landsberger 1967, 157–158. Some of the textile inventories from Nuzi are presented in transliteration and translation in Lewy 1959, 9–12.

85 Dalley 1991, 124 and Scurlock 2008, 175 n. 71 who notes that the woad might have produced an intense blue similar to that of indigo, see also Cardon 2007, 367–371 for the various types of woad.

86 CAD I, 164a and AHw, 347.

87 Graslin-Thomé 2009, 190–195.

88 Scurlock 2008, 175; Cardon 2007, 108–115 and Graslin-Thomé 2009, 195 for a presentation of this dye in 1st millennium sources.

89 The tablet is sealed on the reverse, probably by Kip-kušuh who is otherwise known from two other texts found in the same room: HSS 13 165 (a receipt of *zianātu* blanket) and HSS 14 214 (= 585) an expenditure of *nirwe*, an unidentified product.

90 For the kermes dye, see Cardon 2007, 610–619.

91 The contract is studied by Zaccagnini 1977, 178–179. The kermes dye also appears in one Ugarit text, see van Soldt 1990, 347. For Neo-Assyrian evidence as regard the amount needed for dyeing with this product, see Gaspa 2013, 228–229.

92 AHw, 479b; Pfeiffer and Speiser 1936, 121–122 and Landsberger 1967, 167 who considers that the word is probably not etymologically linked to Canaan.

93 All the occurrences are conveniently collected by Fincke 1993, 140–141.

94 For *Kel-Teššub*, see § 1.2.2.

95 L. 4–6 : *ú šum- <ma>* 4 *udu-meš* 2 *ta-pa- < <la> > -flu*] *šu-šu-up*-(TU)-pu, 6 *ma-na* *sig* 10 *gín ta-am-ká-far*]-hu *ú ki-na-hu*, 13 *pá-hu-us-sú* 3 *ma-na x šu-hu-ul-hu*. *Šuhulhu* is an hapax, see CAD Š/3, 210a.

96 Mayer 1981, 252; Astour 1987, 36 and Cardon 2007, 414–418.

97 L. 1–15: *ša iš-ka-ri-e-meš, ša ša-ad-dá-ag-di, mi-im-mu-šu-nu-ma bá-ši-il-ta-šu-nu, na-din à a-pí-il, mi-im-ma ia-nu ša i-ri-hu*, (1 line drawn) *ù ša mu-ti an-ni-im, ša 3 ta-pa-li, hul-la-an-ni*, 6 gín *[ki]-na-ah-[hu]* *s[ig₅-qú nam]-ru*, 3 gín *tam-ka-ar-h[u]*, *sig₅-qú nam-ru*, [3] gín *šu-ra-at-[hu]*, *sig₅-qú nam-ru*, *a-na šu* *mké-lip-lu[gal]*, *na₄ mši-la¹-hi¹(IK)-te-šub* dub-sar. Transcription in Zaccagnini 1975, 88.

98 Michel and Veenhof 2010, 244. The interpretation as ‘black’/‘grey’ (AHw, 1287) is mostly based on the etymological comparison with the Hebrew cognate.

99 Mayer 1978, 172.

100 The quotation in CAD Š/3, 368 needs corrections. The copy shows clearly 12 shekels and not 9. This quantity fits the total of 1 mina and [3] shekels in l. 9–10. Note also that ‘silver’ in the CAD transliteration corresponds to *ta-bar-[ru]* in the text (l. 6). For the *mardatu* fabric, see now Smith 2013.

101 Edited by Mayer 1977, 178. Note also the small quantities of *takiltu*, *tabarru* and *šurathu* recorded on the left edge of the tablet: five shekels and a ‘fraction’ (*šehetnu*) for making the edge (*writannu*) of a *mardatu* fabric.

102 Dalley 1991, 124; Cardon 2007, 566–577; Graslin-Thomé 2009, 196–204.

103 CAD T, 71a.

104 The purchase of these products is suggested by the word for ‘price’ which might appear in the last line of the obverse ([š]i-me iš-p[a x x]). The reverse is destroyed.

105 The quantities distributed correspond to one or two shekels, except in l.3 in which 10 shekels are recorded, see collation in Röseler 1999, 399 n. 26.

106 See G. Wilhelm *apud* Röseler 1999, 399 n. 26 and Stein 1993a, 149. The meaning is uncertain for the CAD T, 450. The word *šiklu* which in most cases precedes the term *tu’e* is not a part of it but probably a gloss for shekel, see CAD Š/2, 435–436 *pace* AHw, 1234b sub *šiklitu*.

107 Durand 2009, 153–154.

108 Concerning this stone and its colour, see now Schuster-Brandis 2008, 408.

109 For this dye, see Cardon 2007, 367–371.

110 L. 4: 1 túg síg ša munus ša su-un uq-na-ti.

111 CAD B, 140–141.

112 See for example HSS 14 616 (AdŠ 516A): 26 where upholstery textiles (*purāku*) dyed and ‘white’ are recorded. Another instance is found in the palace inventory HSS 14 247 (L27): 37–38, where dyed and ‘white’ leggings (*kaballu*) are mentioned. The CAD P, 330a interprets these occurrences as ‘bleached’.

113 For a discussion of this question in a broad perspective, see Cardon 2007, 6–11 and Breniquet 2008, 131–132.

114 L. 1–11: 3 *ku-du₄-uk-tu₄ síg*, *a-na tu-uh-ši-we*, *a-na ša-ab-šu-li a-na* *‘a-mu-ur-qa-as-sa₃*, *na-ad-nu*, *ù la i-din-na*, 3 *ku-du₄-uk-tu₄ síg*, *a-na tu-uh-ši-we*, *a-na ša-ab-šu-li*, *a-na* *‘ti-ir-wi-né-el-li*, *na-ad-nu* *ù la i-din-na*, ^{Rev}(Seal impression) *na₄ ‘ti-ir-wi-né-el- < li >*, ^{Rev}(Seal impression) *na₄ ‘a-mu-ur-qa-as- < sà >*.

115 EN 10/2 70, 27–32, see Maidman 2010, 95. A presentation of the use of oil at the different stages of the wool processing and fabrics manufacturing is found in Rougemont 2011, 375; see also 377–378 for a discussion on HSS 14 630 (AdŠ 78) and HSS 13 198 (AdŠ 79).

116 In HSS 15 166, it might be the same Atte, although using a different seal, given the fact that this tablet is an account of cloth allowances also found in room L44. All my thanks to Dr. A. Löhnert for checking the tablets.

117 See also HSS 15 226 § 2.5.11.

118 L. 1–7: 6* gín *šu-ra-at-hu*, 5 gín *ki-na-ah-hu*, 10 gín *ta-wa-ar-ri-we*, (1 line drawn) 20 gín *ta-wa-ar-ri-we*, *a-na* *ib-lá, ši-la-an-ni*, *‘at*-te*, *il-qè*, ^{Rev}(Seal impression*).

119 Akap-šenni’s obligations were stated in a tablet that Ithiṣta ‘broke’ as the deal was cancelled. However according to Ithiṣta’s declaration, Akap-šenni was not present at that moment. The reality of the cancellation could therefore have been questioned. HSS 5 32 aims then to protect Akap-šenni against any future claim from Ithiṣta, see Zaccagnini 1977, 184.

120 See already Pfeiffer and Speiser 1936, 122.

121 Zaccagnini 1977, 174. The locality is situated in the vicinity of the capital Arraphe, see Müller 1994, 182 and Fincke 1993, 284–285. The clustering of craftsmen based on their specialties is also documented throughout such a place name as: the ‘dimtu-settlement of the potters’ or the ‘dimtu-settlement of the weavers’ and the ‘street of the weavers’ (in Nuzi), and the ‘city of the scribes’, see Fincke 1993, 77, 212, 302–303 and Müller 1994, 83.

122 Transliteration and translation of the letter in CAD I/J, 308. Packing wool in this type of bag is also documented at Mari and Chagar-Bazar, see CAD G, 143a.

123 For the wool rations of the Šilwa-Teššub’s household, see also Wilhelm 1985, 25.

124 L. 24–26: 2 *ma-na síg-meš a-na mu*, *ù mu ki-ma*, *lu-bu-[ul]-ti-šu*. In most cases, the *tidennūtu* contracts state in general terms that the creditor has to supply the pledged person with his food ration

and a clothing allowance (síg) *lubultu*, see Eichler 1973, 17–18.

125 Restored according CAD Q, 134a.

126 For *šesimtena*, see CAD Š/2, 337. In SANTAG 4 29, it is mentioned as a part of a wheel, see Müller 1998, 92. For real estate sales in which the payment is defined as the ‘purchase price’ (*ana šimi*) instead of the more common ‘gift’ (níg-ba), see Fincke 2010, 127–129.

127 L. 15–16: 1 ma-na sīg-meš a-na ši-me¹⁶² dal ki-ir-ri-i[m]. For *kirru* a standardized container for beer, see CAD K, 408. The word seems so far to be attested by a single occurrence in the loan of malt HSS 15 244, see CAD K, 410. The CAD judges this occurrence as uncertain. However, the fact that the malt is expected to be reimbursed ‘in the day of the beer container’ makes good sense. *Tallu* containers for beer (dal kas) are well attested in the Nuzi texts, see CAD T, 102a.

128 Grosz 1988, 113–114 and text edition, 266.

129 Müller 1998, 35–36. For the meaning of *hašahušennu*, see most recently Pfeifer 2009, 381.

130 Müller 1998, 239–241.

131 Note that this text gives a hint as to the value of the coloured wool in relation to undyed wool.

132 The chariot cart or a part of its wheel, see Abrahami and Lion 2012b, 287.

133 L. 2’–3’: 6 ma-na 60+40 sīg-meš a-na ši-im, ^{giš}ūr-meš ù 20 ma-na urudu-meš, see Lacheman and Owen 1981, 385 no.5 for the transliteration and the comment on the possible evidence drawn from this text, for a heavy mina of 100 shekels. Grosz translates: “6 mina of wool (measured with the mina of) 100 (shekels)”, see Grosz 1988, 118.

134 See for example JEN 947 in Maidman 2003, 113 and CAD E, 350a.

135 For this text, see Negri Scafa 2012, 216.

136 See Spering 2005, 248; l. 12–13. The word for salary is not explicitly mentioned. However, the very long account of barley expenditures from the same archive, HSS 13 358: 68 (AdŠ 42), shows that this group of workers are hirelings as the barley which they received is explicitly qualified as ‘salary’.

137 For a detailed study of this texts, see Lion and Sauvage 2005, 81–83. Payment of wool for making bricks are also attested in Neo-Babylonian times, see Zawadsky 2002, 150–152.

138 For the reading *eš-še-tu₄* see Wilhelm 1970, 56.

139 Maidman 2009, 288–290. In most instances, this kind of payment is supplied in barley sometimes combined with tin, see CAD U/W, 333b.

140 See the texts collected in Lion 2004 and Fincke 2012.

141 See the information collected in Grosz 1981 and more specifically 176–177.

142 Fahdīl 1983, 320–321.

143 Literally: “If he (the debtor) doesn’t give the sheep and the wool, what will be born and what will be plucked is on the debit of the Pai-Tilla (the debtor)” (*šum-ma udu-meš ù sīg-[meš] la i-na-an-din ù i-na ugu-hi-šu ša ṣpa-i-til-la ú-la-ad ù fba[-aq-nu]*), see JEN 128, 11–14.

144 In Nuzi terminology, these contracts are labelled *tidennūtu*. In exchange for different commodities that he borrowed, the debtor places at the disposal of his creditor as security either himself (eventually a person of his family) or real estate. The work done by the pledged person or the use of the real estate constitutes the creditor’s interest, see Eichler 1973, 37–46; Stein 1993a, 65–66 and Zaccagnini 2003, 609–610.

145 Edited in Jankowska 1969, 248.

146 Maidman 1999, 330–331.

147 The composition of the flock is given in detail lines 10–19: 12 sheep are divided in two groups (1 wether for 5 ewes) The sheep are described as “n times red marked” (*sime šaripu*), see CAD Š, 111a; AHw 1058b and Schneider-Ludorff 2002b, 152. One goat is described as “hairy 3 times shorn” (*ša šarti 3-šu gazzu*). The other as *šeklīnu*. The word is a hapax, see CAD Š/2, 267a. The AHw 1210a suggests a link with *šklitu’u* for which see n. 106. For more information related to the composition of the flocks, see Morisson 1981, 273–276.

148 For other antichretic loans in which the debtor receives a piece of cloth whose dimensions and weight in wool are specified, see EN 9/1 260 and the documents studied by Zaccagnini 1981.

149 L. 57–58 : (...) *mi-nu-um-me-e ma-na-[ha-ti]*, še-meš gu₄-meš udu-meš sīg-meš i-meš tú[g-meš].

150 L. 24–26 : [*i-na é-meš, ù*] a-ša *ma-na-ha-[tu]*, *mar-[ši]-ti i-na* gu₄-meš sīg-[meš].

17. Wool Production and Economy at Ugarit

Valérie Matoïan and Juan-Pablo Vita

In 1929, Claude Schaeffer carried out the first archaeological campaign in modern Ras Shamra (Syria). The tell is located about 10 km to the North of the modern city of Latakia (Syria) and less than 1 km from the Mediterranean coast.¹ The mound site contained the remains of the ancient city of Ugarit, the capital of the kingdom bearing the same name. From 1929 to the present, except for the duration of World War II, Ras Shamra-Ugarit has regularly been excavated by a French – later Syro-French – mission.² This long series of archaeological campaigns has brought to light the royal palace and a building complex closely linked to it, several temples, remains of fortifications, important residential areas, several private and palatial archives and a great amount of all types of archaeological objects. Just about 1/6th of the tell of Ras Shamra has been excavated.

Therefore, eighty years of research and seventy archaeological campaigns have allowed us to gradually come to know the history and culture of the ancient kingdom of Ugarit, located on the Syrian coast. Because of its geographical extension, political power and military capacity, it was a middle-sized kingdom within the parameters of Syria in the 2nd millennium BC, but a leading one from an economic point of view. Ugarit disappeared from history at the beginning of the 12th century BC, swept away by the wave of the so-called ‘Sea Peoples’, a time which witnessed the collapse of the main Syrian centres of the Final Bronze age and the disappearance of the kingdom of Hatti.

The texts from Ugarit provide information regarding different crafts and trades, such as work with hard stones, precious stones and metals, the construction of houses, ships and chariots, the production of different weapons, the manufacture of pottery and food and the textile industry. The research carried out in the last thirty years has always been interested in the question of textiles in Ugarit from different yet complementary perspectives. In line with this investigative trend, this contribution intends to provide a global view of the information yielded by Ugarit on matters regarding sheep and wool as much from an archaeological, material and iconographic point of view as from a textual viewpoint.³

1. Sheep

1.1. Zooarchaeological data

Sheep husbandry is attested to in Ras Shamra since the Neolithic. Depending on the period, the significance of sheep flocks varied and they had a greater or lesser

prevalence and relevance to the domestic economy.⁴ Two recent zooarchaeological studies have been conducted on bone fragments from the Late Bronze Age city, *intra muros*. The first analysis, carried out by E. Vila and published in 2008, is based on the study of bone remains from various areas in Ras Shamra: ‘Centre de la Ville’, ‘Sud-centre’, ‘Grand-Rue’ and the sectors excavated in 1975–1976. The conclusions reached reveal that sheep and goats are the most commonly consumed livestock: approximately 55% of the bone remains found may be attributed to these animals.⁵ The significance of sheep, which in the Late Bronze Age in Ras Shamra were mid-sized,⁶ would be higher than that of goats, the equivalent proportion being 2 to 3 sheep per goat. A general trend may also be described in the Late Bronze Age: the slaughter profile of sheep and goats contains a low percentage of mature adults which might indicate that breeding was orientated towards meat production rather than wool production. A second study, by J. Chahoud and E. Vila,⁷ qualifies the initial results: the slaughter patterns based on livestock remains found in the so-called ‘Maison aux albâtres’ show a high frequency of adult animals bred for meat as well as for wool.⁸

For our subject, no published data are available yet for locations outside the city of Ugarit.⁹

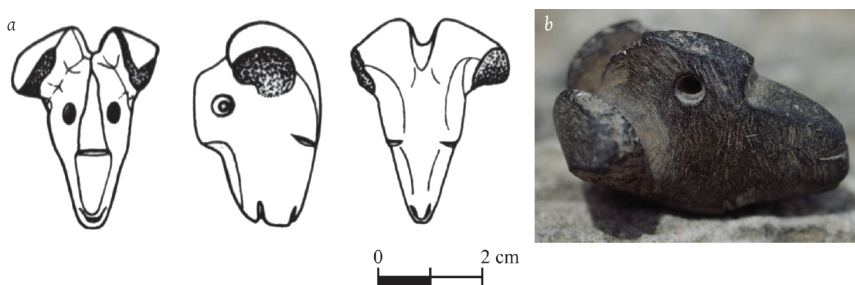


Fig. 17.1. Head of an ewe or ram (RS 30.106), steatite, H. 3.7 cm, Ras Shamra, Level III B 1 (© Mission of Ras Shamra, a: drawing after Contenson 1992; b: photograph by V. Matoïan).

1.2. Iconographic data

The first known representation of a sheep in Ras Shamra dates to the Chalcolithic period. It consists of a small steatite object in the shape of the head of an ewe or ram (RS 30.106), from Level III B 1 published by H. de Contenson (Fig. 17.1).¹⁰ A similar piece (RS 26.330), found during excavations in the sector of ‘Tranchée Sud-acropole’, we believe could correspond to the same period.¹¹ Unfortunately, the horns are broken in both specimens. Another piece (Louvre AO 13161) depicts a sheep with long spiral horns. This object, in better condition, is closely related to the other two both in shape and material (steatite).¹²

Figurative representations are rare in the Chalcolithic period. Hence, choosing this animal indicates that it played a relevant role in the lives of the people, either from a cultural or from an economic point of view. These images could be linked to the identification, within archaeozoological studies, of a larger population of sheep with spiral-shaped horns from the fourth millennium BC onwards.¹³

While examples of iconography are much more prominent in the Late Bronze Age, few images in this period may be associated with certainty to sheep or goats.

Animals depicted in the bestiary of Ugarit, whether representations on locally

produced or imported objects, only partially reflect the species identified through the study of bone remains found in the tell of Ras Shamra. Cylinder seals yield the most abundant documentation. Documents are difficult to analyse, as images are small and representations are often schematic and stylized. Most animals are simply outlined.¹⁴ Generally, domestic species are less frequent in imagery than wild animals.¹⁵ But most of the time it is hard to identify exact animal species. Glyptics depict numerous representations of goats though it is often impossible to discern whether the figure illustrates a goat or a gazelle (Fig. 17.2).¹⁶ In some cases, the animal seems to be inside a fenced area;¹⁷ on other occasions, it is linked to a vegetable¹⁸ or to an anthropomorphic figure.¹⁹ No representations of milking, butchering or shearing activities have been identified.

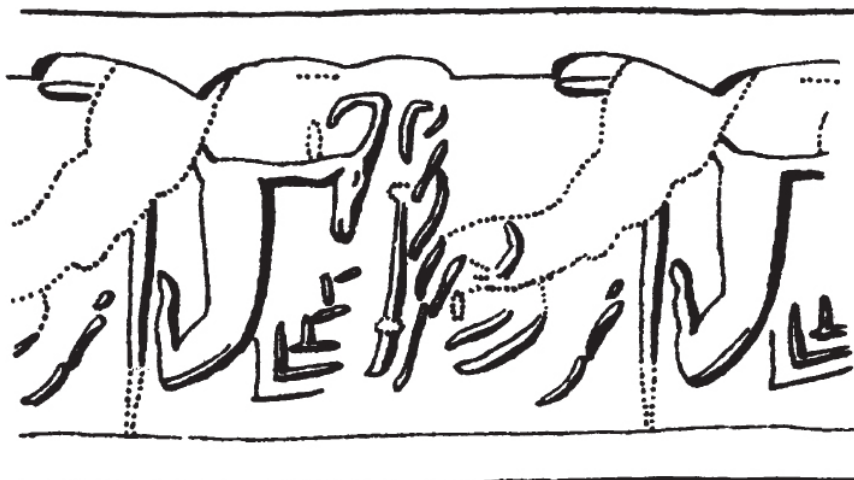


Fig. 17.2. Cylinder seal (RS 6.213), faience, Ras Shamra, Late Bronze Age: representation of goats or gazelle (after Schaeffer 1983).

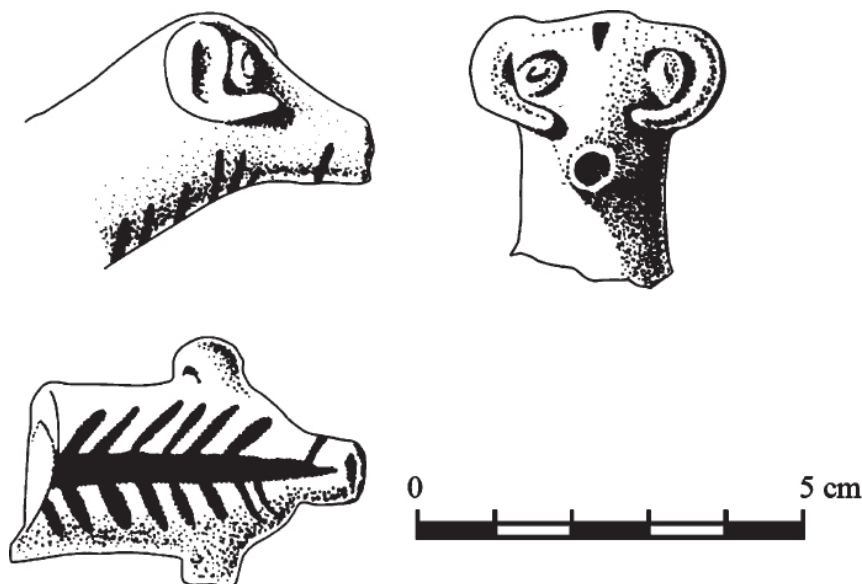


Fig. 17.3. Ram head-shaped spout of a vessel (RS 84.5105), painted pottery, Ras Shamra, 'Centre de la Ville', Late Bronze Age (© Mission of Ras Shamra, after Monloup 1987).

Except for a few instances, sheep seem absent.²⁰ This is surprising for various reasons: a) as pointed out by E. Vila,²¹ the meat economy in Ras Shamra basically rests on sheep, goats and bovids,²² b) sheep provided wool (see below §1.4), and c) sheep are one of the animal species most frequently found in sacrificial offerings made to the gods.²³ We must, however, point out a small-sized zoomorphic metal balance weight depicting a recumbent sheep or ram.²⁴ All other representations of ram are fragmentary and consist of the animal's head. Most of them correspond to likely ritual vessels of ceramic (Fig. 17.3), faience or stone.²⁵ Finally, some representations of sheep entrails are preserved, clay or ivory three-dimensional figures in the shape of livers which were used in extispicy.²⁶

Ugaritic texts		
<i>uām</i>		
<i>uām-er-tu-meš</i> ²⁷		
<i>udu(-nita)</i> ²⁸		
<i>baš</i> 'sacrificial ewe, sheep'		
<i>lām-er-tu-meš</i>		
<i>lūckling</i> (lamb or kid)'		
<i>phē</i> 'yearling lamb'		
<i>kām</i>		
<i>lām-er-tu-meš</i> 'cattle', coll. 'ewe(s), flock of sheep, sheep'		
<i>uš-udu-hi-a31</i>		
<i>uš-sal'-udu-hi-a32</i>		
<i>šām</i> , 'sheep'		
<i>lām</i>		
<i>lām</i> ¹⁸³³		
<i>lām-er-tu-meš</i> 'sheep'		

Table 17.1. Sheep terminology in Ugarit texts.

1.3. Terminology

Ugarit texts, both alphabetical and syllabic, contain at least one dozen terms to refer to various kinds of sheep. This terminology has been appropriately studied respectively by G. del Olmo (1993) and J. Sanmartín (1993), and jointly by both authors in their dictionary of the Ugaritic language (DUL). Table 17.1. shows the results of these investigations.

Overall, these terms refer both to gender³⁵ and to different ages³⁶ or types of sheep.³⁷ However they are not all used at the same level. Some lexemes are only used in the sphere of mythical and epic texts, that is, in literature (*a/il*, *kr*, *llu*, *phd*). Others are exclusively used in literary and ritual texts (*imr*, *tāt*, *dqt*). Others occur in literary and cult texts as well as in epistolary, legal or clerical documents. At times – at least in currently available texts – the alphabetic version of a term is used in a specific literary genre while the syllabic or logographic version is used in another.³⁸ The terminology compiled in the table may also be revised; some terms have an ambiguous meaning (*llu*), unusual scripts (*udu-nim-ma*, *u₈-sal'-udu-hi-a*) or their precise meaning continues to be under discussion (*dqt*³⁹).

1.4. Sheep in family economy and trade

Legal and clerical texts allow us to catch a glimpse of the role played by sheep in the economy of families. Some family registers record between seven and sixty sheep per family unit,⁴⁰ far below the number of sheep involved in commercial or private exchanges, including the importation of sheep into Ugarit⁴¹ or from the flocks controlled by the central administration (see below §1.5).⁴² Based on these figures we may conclude in agreement with G. del Olmo that “The Ugaritic texts reflect in this way a modest peasant society and give a very ‘credible’ image of the organization and standard level of the agricultural economy of the Ugaritic Kingdom, far from the fanciful affluence that the Eblaite texts show in this connection”.⁴³ In any event, it is highly likely that the economy of sheep owning families had to be complemented with the product of farming labour, though some families do seem to have been able to base their entire economy on the exploitation of their ovine herds.⁴⁴

How much were sheep worth in the market? If we bear in mind that one Ugaritic shekel weighed on average 9.4 g,⁴⁵ two clerical texts reveal that one sheep (*šin*) cost between two-thirds and one silver shekel.⁴⁶ By comparison, one heifer (*prt*) cost five shekels,⁴⁷ one young bull (*pr*) ten shekels⁴⁸ and one mare (*sst*) 35 shekels.⁴⁹

1.5. Sheep in the administration and palace economy

Flocks of over one thousand head were controlled by the central administration. One clerical text notes down, for instance, a total of 1,821 sheep delivered to the palace by different persons, probably as *maqqudu-tax* (see next), in groups of sheep ranging from 3 to 86 head per person.⁵⁰ Other texts record deliveries from 68 to 201 sheep of various types.⁵¹ Overall, documents show that the areas in the East and Northeast of the kingdom seemed to combine the best geographical and environmental conditions for breeding livestock.⁵²

As some legal and clerical texts reveal, at least some of these sheep and goat livestock were under palace economic control through a grazing tax called *maqqudu*, a contribution on pasturing land which had to be paid to the palace in ‘sheep’, and the king could decide on exemptions as he deemed appropriate.⁵³ The

central administration monitored the payment of this tax both by private persons and by professional groups and localities.⁵⁴ Palace-owned sheep, in greater or lesser herds, were then entrusted to shepherds working for the central administration.⁵⁵ However, apart from indications regarding plucking⁵⁶ and fattening techniques,⁵⁷ texts provide hardly any information on the breeding, herding and keeping of sheep.⁵⁸

2. Wool: operational sequence

After the raw material was obtained (wool, linen, etc.) it had to undergo a series of technical processes before being made into fabrics. These processes are ordered in an operational sequence or 'chaîne opératoire' whose phases have been described by Breniquet as follows:⁵⁹ 1) stretching, 2) spinning, 3) twisting, 4) making the yarn, 5) entwining, 6) weaving and 7) folding. Ugarit does not provide archaeological or textual data for stages 1,⁶⁰ 3,⁶¹ 4, 5 and 7, though phases 2, and 3, as weighing are attested to.

2.1. Materials

Wool was, along with linen,⁶² the main raw material in the textile industry of Ugarit.⁶³ The Ugaritic term for wool is *š'rt*⁶⁴, vocalized *šá-har-tu* (/ša'artu/) in a syllabic text,⁶⁵ written *síg* in Ugarit syllabic texts.⁶⁶ Besides *iqnu*-type of wool (see later), one clerical text registers one talent of *š'rt mšrt*, which perhaps might be understood as 'Egyptian(?) wool'.⁶⁷

Plucking was done by *gzzm* 'pluckers'.⁶⁸ However, we do not have textual or archaeological evidence on how this task was performed in Ugarit, what specific process was used to obtain wool or what implements or tools were involved.⁶⁹ Texts do indicate that wool prices could vary greatly:⁷⁰ depending on the document, one talent of wool (= 28.2 kg)⁷¹ could be worth 1,⁷² 2,⁷³ 4⁷⁴ or 7⁷⁵ silver shekels; it should be noted that in two places of the same text, RS 21.184A (4.707), one talent of 'wool' (*š'rt*), without specifying its quality or characteristics, is worth one and two shekels. This difference in price is unquestionably due to the different quality of wool obtained after plucking.⁷⁶ One talent of *iqnu*-type of wool could be worth 5.3 shekels.⁷⁷

2.2. Spinning

Some texts mention the presence of both spinners (*ǵzlm*)⁷⁸ and spindles (Ug. *plk* = Akk. RS *pilakku*),⁷⁹ and a spindle-whorl inscribed with the latter has been recently published.⁸⁰ The main material testimony to the activity of spinners are, precisely, shafts and spindle-whorls.⁸¹ Spindle-whorls, either made of stone, ivory or bone,⁸² and much more rarely of terracotta,⁸³ are often the only preserved parts. The shafts found are made of hard animal material though they must have been mostly of wood or cane.

A comprehensive catalogue of all finds is under preparation recording the material, shape, size and weight,⁸⁴ as well as decoration pattern of the object where applicable.

The study of excavation reports, inventories of the finds and recent investigations carried out within the framework of the *mission*, reveals that this type of object has been found in different sectors within the capital as well as in Minet el-Beida and Ras Ibn Hani. Contexts are varied: homes, cultic places, shrines,

graves and the royal palace.

An analysis of stone spindle-whorls has revealed the preferred use of one type of stone: steatite-chloratite, as well as the existence of local manufacture.⁸⁵ Most specimens are dome or cone-shaped.⁸⁶ Spindle-whorls are generally small with a diameter ranging from 2 to 3 cm. There are, however, larger stone spindle-whorls, 5 cm to 8.5 cm in diameter;⁸⁷ their upper sides are often decorated with radial engraved decorations.⁸⁸

C. Elliott, in her work of 1991, had pointed out the existence of engraved marks on two spindle-whorls housed in the Musée du Louvre.⁸⁹ This author had linked these to two Cypro-Minoan signs (CM 5 and CM 6), though he also stated that these are common motifs also found in Canaanite amphorae (for the cross motif).⁹⁰ These marks may have been purely decorative. We have recently identified within the inventories of the mission a stone spindle-whorl (RS 26.166) with an engraved mark on the upper side consisting of three intersecting strokes (Fig. 17.4). It is dome-shaped, 1.8 cm high and 4.5 cm in diameter. The inventory of the finds does not, unfortunately, record the context of the finding for this spindle-whorl, listed in the register of campaign 26 of 1963. As the aim of this campaign was to dig the ‘Tranchée Sud-acropole’, the object might originate from this zone. We must also point out that this sign is also attested to in Ras Shamra on a Cypriot *Base-Ring* bowl (RS 24.29).⁹¹



Fig. 17.4. Spindle-whorl in steatite with an incised sign (RS 26.166), D. 4.5cm, Ras Shamra (1963) (© Mission of Ras Shamra, sketch after the register of 1963, graphics S. Shabo).

An initial study into the contexts of the finds focused on four habitat sectors (‘Centre de la Ville’, ‘Quartier égéen’, ‘Tranchée Ville Sud’, ‘Tranchée Sud-acropole’) revealed the uneven distribution of the finds. ‘Centre de la Ville’ is, by far, the sector yielding the most stone spindle-whorls: almost forty examples have been published corresponding to fewer than ten architectural units and the building known as ‘Temple aux rhytons’.⁹² In the so-called ‘Quartier égéen’, we have recorded less than fifteen stone specimens and two terracota examples

corresponding to about thirty houses or portions of houses, and in the area 'Tranchée Ville Sud' only seven spindle-whorls corresponding to 37 buildings or portions of buildings. In the case of these last two zones, only some of the houses are involved in these finds. For the area 'Tranchée Sud-acropole', this type of artefact is practically non-existent when metal needles are numerous (see *infra*).

We have already highlighted the high number of spindle-whorls found in House F of the area 'Centre de la Ville': eight specimens, five of them in the same area, locus 1222. A specific stone installation (1231) was found in the latter, made up of a large stone discoidal slab whose walls have been made of several flat stones (Fig. 17.5).⁹³ O. Callot had suggested interpreting it as being intended for washing textile raw material or dyeing fabrics.⁹⁴ In 2010, on the occasion of comprehensive clearing carried out in the area of the Centre de la Ville, we were able to examine the implements from House F of the area, 'Centre de la Ville'. The excavators did not mention the existence of traces of plaster and we have not noticed any traces of plaster linked to this basin, which would have been essential for waterproofing it for use for washing or dyeing. Besides, as we have pointed out, no implements used for heating have been found at this location. We would like to suggest another possible use for this installation: might it not have been used as a properly delimited and clean storage space for wool to be spun later? The existence of five small sized spindle-whorls in this location would support this hypothesis. Despite the fact that the group of finds from Ugarit seems to provide evidence of the existence of domestic craftsmanship, in the case of House F, a more intensive level of spinning work seems to be apparent.



Fig. 17.5. Basin from the locus 1222, House F, 'Centre de la Ville', Late Bronze Age (© Mission of Ras Shamra).

2.3. Dyeing and winding

Available texts from Ugarit provide considerable evidence regarding the activity of dyeing. Furthermore, some as yet unpublished documents mention the dispatch of wool, linen and garments from Ugarit to various locations as well as the delivery to Ugarit of several quantities of these products. Two (unpublished) letters from Ḫatti found in the so-called 'House of Urtenu' deal with the delivery of wool and garments which were to be dyed in Ugarit; it would therefore appear that the industrial activity of transforming the wool coming from the Hittite area was also carried out in Ugarit.⁹⁵

The most frequently used terms in Ugaritic texts to designate types of purple dyed wool are *iqnu* (síg-za-gìn / *takiltu*) and *phm* (síg-za-gìn sa₅, síg-sag-gil-mud / *ḥašmānu*), perhaps the most appreciated wool qualities in Ugaritic society. The former could designate violet or blue-purple dyed wool,⁹⁶ the latter could refer to deep red or ruby purple.⁹⁷ Hence, they would generally designate a dark or light purple colour.⁹⁸ But texts also refer to other shades of purple using terms whose exact meanings have been the subject of discussions: *šmt* (síg-hé-me-da/ta,

šig-sa₅ / *tabarru* ‘carnelian red/red-brown purple’,⁹⁹ *hndlt* (šig-za-gin: *ḥandalati*)¹⁰⁰ ‘yellow-green colouring’(?),¹⁰¹ *dupašši* (šig-za-gin: *dupašši*)¹⁰² ‘yellowy-brown’,¹⁰³ (šig-za-gin) *ḥašertu*¹⁰⁴ ‘green(?)’, ‘yellowish-green(?)’.¹⁰⁵ Table 17.2. summarizes the above.

Ugaritic	Transliteration	Meaning
ḥndlt	ḥndlt	yellow-green colouring(?)
dupašši	dupašši	yellowy-brown
ḥašertu	ḥašertu	green(?)
ḥašertu	ḥašertu	yellowish-green(?)
ḥašertu	ḥašertu	yellowish-green(?)
ḥašertu	ḥašertu	yellowish-green(?)

Table 17.2. Ugarit: terms to designate types of purple-dyed wool.

One talent of *purple-ḥašmānu* (*pḥm*) would cost, on average, 4 silver shekels and one talent of *purple-takiltu* (*iqnu*) around 5 shekels.¹⁰⁶

Experts in purple work are called *qnum* (*qannā’ūma*).¹⁰⁷ In performing their task, the only mordant clearly attested to in Ugaritic texts is *alum* (alph. *abn šrp*, syll. na₄ ka.bi, na₄ *gabū*); documents reveal that it was abundantly traded.¹⁰⁸ Other texts seem to refer to copper (alph. *tlṭ*, syll. urudu) as a colouring agent (for colour green),¹⁰⁹ this being the only dyeing material for which direct archaeological traces have been found in Ugarit.¹¹⁰

Texts, however, do not provide details on other aspects involving dye such as, for instance, dyeing workshops, their organization or the procedures used for treating *murex* or the various dyes. Nonetheless, one category of archaeological remnants does inform us, indirectly, on one specific type of dye: a *murex*-based tint briefly referred to by C. Schaeffer in a note in 1951. On this subject, we currently have the description made by C. Schaeffer of his findings in Minet el-Beida, which included deposits of crushed *murex* shells (probably Ug. *ḡlp*)¹¹¹ and one fragment of a pot with the remains of a purple dye.¹¹² At the time of Schaeffer’s findings no laboratory analyses were conducted and to date we have not been able to find indications of those vestiges in museums.¹¹³

On the other hand, we also have more recent finds both from Ras Shamra and Ras Ibn Hani. The floors of some dwellings include numerous fragments of shells in their composition as well as complete shells, though less frequently. These floors correspond to the Northern Palace of Ras Ibn Hani (studies have confirmed that these shells mainly consist of *murex*)¹¹⁴, to *locus* 106 of the house to the south of the ‘Temple aux rhytons’,¹¹⁵ and to the house excavated in the ‘chantier du Rempart’.¹¹⁶ In order to conduct a malacological study of the shells found in the floors of the last two mentioned buildings, several soundings were carried out in 2010 and, with the permission of the General Direction of Antiquities and Museums of Syria, several samples were sent to France for analysis. A. Prieur has observed the widespread use of *Murex* (*Hexaplex*) *trunculus* (Fig. 17.6).¹¹⁷ In room 106 of the house to the south of the ‘Temple aux rhytons’, a 50 × 50 cm sounding was carried out; the collection of all shells found (whole and fragmentary) has provided almost 3 kg of material.¹¹⁸ It can therefore be estimated that a total of 120 kg of shells were needed for the floor of this room.¹¹⁹ It is plausible to propose that these floors, with a predominance of *murex*, are somehow the result of the recycling of waste from dyeing processes involving the use of *murex*.¹²⁰



Fig. 17.6. Fragments of shells: *Murex (Haxaplex) trunculus*, Ras Shamra, Late Bronze Age (© Mission of Ras Shamra, photograph by V Matoïan).

On the other hand, as we have previously seen (see *supra*), we have not followed the hypothesis of O. Callot, who has interpreted two implements placed in the tell (in the ‘Ville Sud’ and in the ‘Centre de la Ville’) as possibly linked to the washing or dyeing of fabrics. Consequently, no *intra muros* facility used as a dyeing workshop has so far been identified. A recent investigation has concluded that no evidence, to date, supports the existence of a quarter specifically dedicated to industrial craftsmanship in the conglomerate located on the tell of Ras Shamra.¹²¹ However, we feel that it is possible to propose the existence of one or several quarters of this kind in the coastal zone of Minet el-Beida. The space surrounding the bay was probably sufficient to meet, at least partly, the needs of trade operations (storage), shipping traffic and craft industry within the capital, in particular in cases requiring larger areas or because of the polluting effects of their work, as in the case of purple dyeing.

2.4. Weaving

The texts also mention the existence of weavers (Ug. *mḥš* = syll. *māḥiṣu*, Akk. RS uš-bar)¹²² integrated within the administrative structure of the palace, as well as one of the results of their work, the *š'rt štt* 'woollen fabric', 'woven wool';¹²³ the price of one talent of this type of fabric was five shekels.¹²⁴

So far, remains of the wooden structure of looms have not been found in Ugarit and, except for a likely representation of a loom on a Middle Bronze Age cylinder-seal,¹²⁵ iconography does not yield data on weaving. Objects which may be interpreted as loom weights (tables 1 and 2) are the only testimonies to the use of vertical looms and, therefore, the main material testimony to the activity of weavers in Ugarit. However, they have not yet been the subject of specific study. The samples found are usually isolated instances: a group of weights has not yet been found which may constitute the remains of a loom placed *in situ*. Moreover, not all weights are necessarily linked to the textile industry and may have been used in other activities such as fishing.

The study of the documentation available for 4 residential sectors of the city ('Quartier égéen', 'Centre de la Ville', 'Ville Sud' and 'Sud-acropole') points out that the corpus of 'loom-weights' comprises less than 20 specimens (for a minimum of 70 houses).

Materials commonly used are clay or stone.¹²⁶ Only stone material from area 'Centre de la Ville' has been the subject of specific analysis.¹²⁷ In this sector, there have been fewer weights found than spindle-whorls: thirteen specimens of stone weights against 54 spindle-whorls. If clay weights are usually discoid or ovoid with a lenticular section, other shapes are attested: a trapezoidal loom weight was found in the 'Centre de la Ville',¹²⁸ and a conical one, in the 'Quartier égéen'.¹²⁹ As we noticed few occurrences and numerous parallels with the Cypriot material (especially from Enkomi),¹³⁰ further investigations on the origin of these artefacts (local or exogenous) and on their function are needed.

As regards ceramic weights, several samples have an incised 'mark' on one of their sides. Two of them, found respectively in the so-called 'residential quarter' (RS 30.324) and in the area of South-Centre Ras Shamra (RS 96.2006) (Fig. 17.7), have 'marks' which connect them, once more, to signs in Cypro-minoan script.¹³¹ They constitute further elements which add to the dossier of the relations between Ugarit and Cyprus, where numerous loom-weights with signs in Cypro-minoan script were discovered¹³² and, in one case, a loom-weight with an inscription.¹³³ However, no loom-weight with the imprint of a seal has been found in Ugarit.¹³⁴

3. Woollen cloth and garments

The texts from Ugarit contain around sixty terms related to cloth and garments,¹³⁵ though just *pld* and *hpn* are mentioned directly regarding wool.¹³⁶ *pld* (*palidu*) is a type of cloth or garment made of wool,¹³⁷ which could also be made of linen and could attain a price of four shekels.¹³⁸ In turn, *hpn* was a garment or accessory¹³⁹ which could also be made of linen or wool.¹⁴⁰ The presence of dyed wool in linen items can be noted, for instance in the *ktn* of Tyre (or 'in the Tyre fashion') registered in RS 15.004:4 (4.132); *ktn* is a cloth made of linen which can be used to manufacture garments,¹⁴¹ and in this case it is specified that it contains a certain amount of red-purple (*ktn d šr pḥm bh*).¹⁴² It is likely that a substantial number of other fabrics and garments may have also contained wool.

While iconography abundantly illustrates cloths, particularly in the form of

garments,¹⁴³ it is impossible to differentiate with certainty between linen and woollen cloth.¹⁴⁴



Fig. 17.7. 'Loom-weight' (RS 96.2006) with an incised mark (cf. CM 31), terracotta, Ras Shamra, area 'Sud-Centre', Late Bronze Age (© Mission of Ras Shamra, photograph by V. Matoïan).

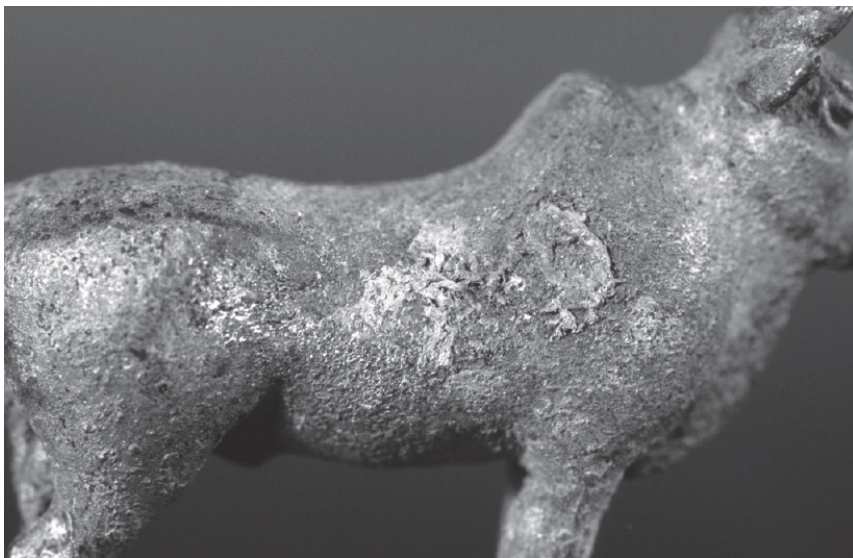


Fig. 17.8. Detail of a bull figurine (RS 23.391), bronze, Ras Shamra, 'Tranchée Ville Sud', Late Bronze Age: remains of textile (photograph by V. Matoïan, © Mission of Ras Shamra).

On the other hand, as we have already pointed out,¹⁴⁵ environmental conditions in the Levantine coast are not suitable for the preservation of perishable materials. Such finds are exceptional. We should highlight the recent find of fragments of a woven mat in the building known as 'Résidence nord'.¹⁴⁶ The only reference to fur we have found concerns the Royal Palace. In 1954, C. Schaeffer stated that 'furs' had been found in 'cour III'. Unfortunately, these vestiges were not preserved and no identification was conducted at the time. Therefore, we cannot include them with certainty in the dossier concerning wool.¹⁴⁷ The few cloth remains found in Ugarit are ruined by corroded gangue stuck to the surface of metal objects. We have noticed this type of remains on two bronze figurines from the 'Tranchée Ville Sud' (Fig. 17.8). As these are in Damascus, we have not been able to conduct a fresh study on them after our first assessment in 2010.¹⁴⁸ The reading of inventories and excavation notes documents other categories: silversmith ensembles¹⁴⁹ or raw materials¹⁵⁰ found in Ras Shamra. We shall also refer to a very interesting find made in the hall XXIX of the North Palace of Ras Ibn Hani: two bronze covered cases containing remains of wood, and on the outer surface of one of them the remains of mineralized textiles.¹⁵¹

We must point out that no description is available regarding the work of assembling textile pieces, their decoration or their eventual repair. Excavations regularly yield needles, made of bone or metal, which may have been used for textile craftsmanship but also in furriery.

We shall recall here the interpretation proposed by J.-C. Courtois in relation to finds in area 'Tranchée Sud-acropole', in the block of houses to the north of grave 4253,¹⁵² where "une grande abondance d'aiguilles à chas terminal de toutes dimensions, depuis les plus fines jusqu'aux plus grosses, qui devaient servir à la confection de toiles et de voiles de bateaux. Tout le quartier sud, compris entre le

secteur de la tombe 4253 et la région limitrophe de l'acropole, devait abriter de nombreux ateliers de métiers consacrés au textile, des tisserands et foulons aux couturiers".¹⁵³

An initial analysis of available documentation reveals an over-representation of these kinds of objects in the area 'Tranchée Sud-acropole' compared to other residential areas. We could identify about fifty specimens amongst the inventories. On the other hand, spindle-whorls are almost non-existent in this sector. As the excavator states, the size of these needles varies and this could indicate different uses. For example, the size of a bronze needle RS 26.01 (length: 16.8 cm; diameter: 0.4 cm) and a metal needle RS 26.08, approximately half the length and thinner (length: 8.8 cm; diameter: 0.2 cm). However, to date we have not identified in this sector of the tell unambiguous evidence of a textile or dyeing workshop, although this is contrary to what might be deduced from the excavator's statement.¹⁵⁴

Conclusion and perspectives

As we have seen, texts from Ugarit provide valuable and informative yet partial evidence regarding the sheep and wool economy and industry. The meanings of the various terms, both regarding types of sheep and classes of dyed wool, will need to be analysed again to attain further accuracy. More attention will also need to be paid to the administration processes underlying palace economic control over wool.

With regards to archaeological testimonies, spinning may be perceived *intra-muros*, though never on a large scale. In this respect, given the current state of available documentation, a direct relationship with wool crafts or linen crafts may not be established. We may plausibly conclude that dye related tasks took place by the seashore, in the area of Minet el-Beida though possibly also in other coastal locations. As soon as the material preserved in Syria is available again, further technical studies shall be essential. Studies recently conducted on material from other locations in the ancient Near East reveal that this perspective is highly interesting.¹⁵⁵ Thus, the find of textile vestiges in a grave from the Middle Bronze age in Sidon as testimony to the use of a weaving technique mainly attested to in Egypt,¹⁵⁶ allows us to resume our debate on the dissemination of the expertise as well as the circulation of textile material and artisans. We could also refer to the exceptional find of vestiges of purple dyed cloths in the royal hypogeum of Qatna,¹⁵⁷ which documents the first stages of purple dyeing in the ancient Near East.

We finally ought to point out that, up until now, in Ugarit, *murex* purple is attested to only in the Late Bronze Age. We have no data for previous periods. As the earliest archaeological evidence for purple-dyeing using sea-snails is found on Crete around 2000 BC,¹⁵⁸ the arrival of this technique in Ugarit from the Aegean is a possible hypothesis.¹⁵⁹ Contacts between Ugarit and Crete in the Middle Bronze age are documented by archaeology and epigraphy.¹⁶⁰ Brendan Burke suggested that Minoan-made textiles, particularly those of colour-fast purple dye from sea snails, were traded in exchange for non-local metals found in the Near East. Such trade could have been a catalyst for the arrival of this technique. Nonetheless, our knowledge of Ugarit in the Middle Bronze age is still too modest for this hypothesis to be validated. Ugarit is a key place for the study of the early development of the purple industry in the ancient Near East, which continued to

evolve in the Levant from the Iron Age onwards.¹⁶¹
 The following tables complement and expand those produced in Matoian and Vita 2009, 484–485.

'Centre de la Ville'	Contexts	Spindle-whorls in stone	'Loomweights' Stone (St) Terracotta (T)	Needles in bronze
<i>Excavations undertaken by M. Yon</i>				
House A				
Locus 1040	Room with domestic activities	1	–	1 (eye)
Locus 1041	Kitchen (?)	1	–	1
Locus 1046	Storage area	1	–	1 (eye)
House B				
Locus 1042	Passage	1		1
Locus 1044	Small storage room	–	1 (?) St.	–
Locus 1045	Room giving access to the tomb	1	–	–
Locus 1067	Vestibule	1	–	–
Wall 1099		1	–	–
Locus 1265	court	1	2 (St. and T)	
House C ¹⁶³				
Locus 1048	Storage room	1	–	1
Locus 1064	court	–	–	1 (eye)
Loci 1066 + 1089	Passage and annex	–	–	1
Locus 1283	From the first floor	–	–	1
House D				
Wall 1223		1		
Locus 1241		2 (or 3)		
House E				
Locus 1067	entrance	1		
Locus 1201	boxroom	1		
Court 1206			1 St	
Locus 1209	entrance		1 T	
House F				
Locus 1221		1	–	–
Locus 1222	Room with a basin	5	–	–
Locus 1258		2	1 St.	–
HOUSE SOUTH OF THE 'TEMPLE AUX RHYTONS'				
Locus 106	From the first floor	1	–	–
Locus 110	Storage room (?)	–	–	1 (?)
Locus 168	From the first floor	1	1 T	–
Locus 184	From the first floor	2	1 St.	–
'Temple aux rhytons' ¹⁶⁴		5	1 St.	
Streets ¹⁶⁵		7	1 St.	
<i>Excavations undertaken by A. Bounni et J. Lagarce</i>				
2 Houses (non complete)		6 St. (one with incised decoration) and 1 T (* 4 in bone or ivory)	3 T	

Table 17.3 Spindle-whorls, 'loom weights' and needles from the area 'Centre de la Ville' of Ras Shamra.

'Tranchée Ville Sud' Data from the inventories		Spindle-whorls in stone	'Loom weights'	Bronze needles
Block I, Locus 3	0.60 – 1.10 m	3 (one with incised design)	1 St. (conical)	–
Block IV, House B Locus 10	0.70 m	–	–	1 (eye)
Block VI, House B Locus 14	2.05 m	–	–	1 (eye)
Block VI, House C				
Locus 23		–	–	1
Locus 28	2.50 m	–	–	1 (eye)
Locus 30	0.85 m	–	–	1
Locus 32	1.50 m	1	–	–
Locus 34	2.10 m	–	–	1 (eye)
Block X, House B				
Locus 1	2.70 m	–	–	1
Locus 8	1.40 m	–	–	1
Block XIII, House A Locus 9	1.90 m	–	–	1 (eye)
Block XIII, House B				
Locus 10	?	1	–	–
Locus 11	1.20 and 1.50 m	1	–	2 (one with eye)
Block XIII, House E Locus 27	1.80 m	–	–	1
Block XIII, House G Locus 50	1.80 m	1	–	–
Block XIV, House C Locus 8	0.70 m	–	–	1 (eye)
Block XIV, House D Locus 11	1.50 m	–	–	1
Block XIV, House F Locus 20	2 m	–	–	1 (eye)

Table 17.4 Spindle-whorls, 'loom, weights' and. needles from the area 'Tranchée Ville Sud' of Ras Shamra.

'Quartier égéen' Data from the inventories		Spindle-whorls Stone (St) Terracotta (T)	'Loomweights'	Needles in bronze
'Bâtiment au vase en pierre'				
Locus 1	surface	1	–	–
Locus 4	1.20 or 1.30 m	–	1 T (with mark)	–
Western Block, House B				
Locus 15	1.60 m	–	–	1 (eye)
Locus 18	0.90 m	–	–	1
Locus 19	1.80 m	–	–	1
Wall loci 18/19	1.20 m	1 (?)	–	–
Locus 18/21/22	0.70–0.80 m	2	–	–
Locus 27	Surface	1 T (with incised decoration)	1 T (conical)	–
'Maison au portique'				
Locus 33	0.50 m	2 St.		
Central Block, House B				
Locus 10	1.40 m			1
Locus 11	1.20 m	2 St.		
Central Block, House C				
Locus 29	1.30 m			1 (eye)
'Maison de Rashapabu'				
Locus 6	1.65 m	2 St.		
'Maison du lettré'				
Locus 47	0.55 m	1 St.		
	1.70 m	2 St.		
	1.90 m			1
	2 m			1 (eye)
	2		Pebble	
Locus 49	1.50 m			1
	1.50 m	1 T		
'Maison de Rapanu'				
Locus 29	1.60 m (floor)	1 St.		
Locus 30			Pebble	
Locus 31	0.80 m			1 (eye)
Tombe VII	dromos			1
Tombe VI	chamber	1 St. (and ivory buttons)		

Table 17.5 Spindle-whorls, 'loom, weights' and. needles from the area 'Quartier égéen' of Ras Shamra.

Appendix: The zoomorphic weight RS 8.172. An unique representation of a ram at Ugarit

Étienne Bordreuil

RS 8.172 is a weight in the shape of a recumbent ram. Its legs are folded around the body and it has a short tail. The horns are coiled forming a spiral shape. Its eyes are protruding and it has a long snout. It is made of cast copper alloy.¹⁶⁵ The base is flat with a central oval cavity filled with a lead tare.¹⁶⁶ There are no breakages and few traces of oxidation. It is an anepigraphic item, 3.81 cm long, 2.51 cm high and 1.96 cm wide. It weighs 47.3 g.

This weight was found in 1936 in the sector known as 'Ville Basse Ouest' ('point topographique 165, chantier III'), during the eighth excavation campaign. Bronze zoomorphic weights appear in Ras Shamra in the Late Bronze Age.¹⁶⁷ The origin of zoomorphic weights in the Ancient Near East could go back to Mesopotamian figurines of animals made of stone from the Jemdet Nasr period which have been interpreted as weights by some scholars,¹⁶⁸ while others dispute this interpretation.¹⁶⁹

RS 8.172 is a unique instance in the corpus of weights from Ras Shamra/Ugarit. It probably depicts a domestic animal. The shape of the horns is redolent of a ram, as only the male sheep have them. But it could also represent a wild animal, in particular a near-eastern mouflon. The spiral-shaped horns contrast with the arched backwards form of the horns of a weight in the shape of a goat, though it is not known whether domestic or wild.¹⁷⁰ Results of analysis conducted on bone material from animals found in Ras Shamra attest to the presence of the remains of sheep and goats.¹⁷¹ On the other hand, epigraphic sources designate sheep in several terms in alphabetic and syllabic cuneiform script. But the use of the term varies based on the literary genres taken into consideration.¹⁷² The weight in question might depict an actual animal, in particular one of those rams recorded in clerical texts and in rituals. But it may also depict an imaginary animal, as conveyed in epic and mythical literature.

The fact that item RS 8.172 is intact and practically uncorroded allows us to attempt to interpret it within a metrological context. Three successive studies have revealed the simultaneous use of four different weight systems in Ugarit in the Late Bronze Age: the 'Karkemish', Mesopotamian, 'Ugarit' and 'Hittite' systems.¹⁷³

These weight systems are based both on number relations of the various units of weight (shekel, mina, talent), and on the average value of each one of these units of weight.

Firstly, the ratio between a talent and a mina is constant in all four systems: the 'Karkemish', Mesopotamian, 'Ugarit' and 'Hittite' systems: one talent equals sixty mina. Conversely, the ratio between a mina and a shekel varies: in the 'Karkemish' and Mesopotamian systems, a mina equals sixty shekels; in the 'Ugarit' system, one mina equals fifty shekels; in the 'Hittite' system a mina equals forty shekels.

Secondly, in the 'Karkemish', 'Ugarit' and 'Hittite' systems, the average value of a talent (28.2 kg) and of a mina (470 g) is identical. However, in the Mesopotamian system the average value of a talent (30.2 kg) and of a mina (504 g) is different. In conclusion, the average value of a shekel varies based on each system and therefore constitutes a marker: a 'Karkemish' shekel, 7.83 g; a Mesopotamian shekel, 8.4 g; a 'Ugarit' shekel, 9.4 g; a 'Hittite' shekel, 11.75 g.

'Karkemish', Mesopotamian, 'Ugarit' and 'Hittite' shekels are attested in Syria and Palestine from the Early Bronze Age¹⁷⁴: the "Karkemish" shekel (7.83 g) in Tell Mardikh/Ebla in the Early Bronze Age¹⁷⁵ and the Middle Bronze Age,¹⁷⁶ in Tell Aḩana/Alalah in the Middle Bronze Age,¹⁷⁷ in Tell Es-Sultan/Jericho in the

Early Bronze Age.¹⁷⁸ The Mesopotamian shekel (8.4 g), widespread in Babylon and Assyria from the Early Dynastic period, appears in Tell Brak/Nagar in the Early Bronze Age,¹⁷⁹ in Tell Mardikh/Ebla and in Tell Açana/Alalah in the Middle Bronze Age¹⁸⁰ and in Tell Es-Sultan/Jericho in the Middle Bronze Age.¹⁸¹ The 'Ugarit' shekel (9.4 g) of the Late Bronze Age, also known as the 'Syrian' shekel, is present in Tell Mardikh/Ebla in the Early Bronze Age¹⁸² and in the Middle Bronze Age,¹⁸³ in Tell Munbaqa in the Early Bronze Age,¹⁸⁴ in Tell Açana/Alalah in the Middle Bronze Age,¹⁸⁵ in Tell Es-Sultan/Jericho in the Early Bronze Age.¹⁸⁶ The 'Hittite' shekel (11.75g) of the Late Bronze Age appears in Tell Mardikh/Ebla in the Early Bronze Age¹⁸⁷ and in the Middle Bronze Age,¹⁸⁸ and in Tell Es-Sultan/Jericho in the Early Bronze Age.¹⁸⁹

We currently do not have reliable data regarding weights for the periods of the Early Bronze Age and the Middle Bronze Age in Ras Shamra/Ugarit, as those levels have not been extensively excavated so far. Nonetheless, taking the regional context into account, it is probable that the simultaneous use of these four systems of weight in Ugarit in the Late Bronze Age may have been deeply rooted in time.

In these circumstances, it is not feasible to favour one particular weighing system and attribute it *a priori* to any given weight. Thus, weight RS 8.172 may correspond either to 6 'Karkemish' shekels,¹⁹⁰ 5 'Ugarit' shekels¹⁹¹ or 4 'Hittite' shekels.¹⁹²

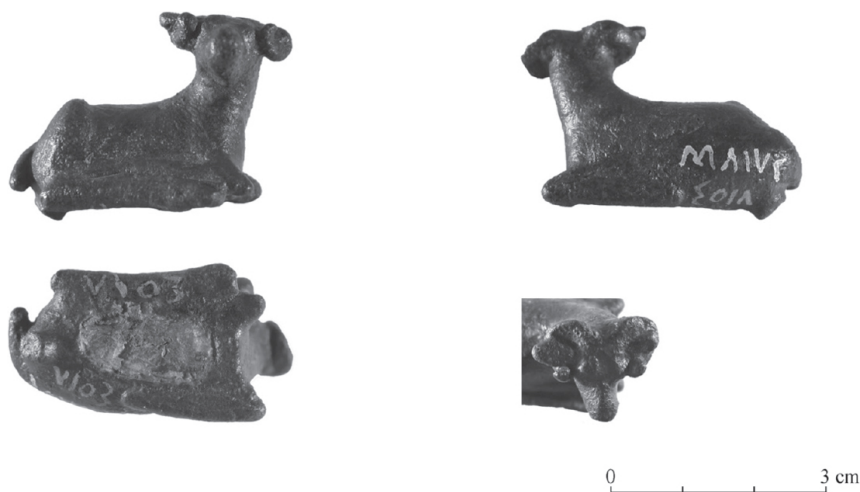


Fig. 17.9. Weight in the shape of a ram (RS 8.172, Musée national d'Alep): views from the front, rear, underside and detail of the head. Ras Shamra. – Ougarit, Ville Basse ouest (© Mission archéologique de Ras Shamra, photographs by E. Bordreuil, graphics by S. Shabo).

The use of *deben* (91g) and one tenth of it, *kedet* (9.1g), spread outside Egypt during the New Kingdom in the form of zoomorphic weights.¹⁹³ From this point of view, we might be tempted to attribute the value of five 'Ugarit' shekels (9.4 g) to weight RS 8.172. Yet, this matter is not easily resolved as a zoomorphic engraved bronze weight from Ras Shamra is more likely linked to a Hittite shekel (11.75 g).¹⁹⁴

Abbreviations

- AHW Von Soden, *Akkadisches Handwörterbuch*. Wiesbaden, 1965–1981.
 CAD The Assyrian Dictionary of the University of Chicago. Chicago-Gluckstadt.
 AR4 Fisher (ed.), *The Claremont Ras Shamra tablets*, Roma 1971.
 DOL del Olmo and J. Sanmartín, *A Dictionary of the Ugaritic Language in the Alphabetic Tradition*, 2 vols. Leiden, 2003.
 PRU Nougayrol, G. Boyer and E. Laroche, *Le Palais Royal d'Ugarit* III. Paris, 1955.
 PRU Nougayrol, *Le Palais Royal d'Ugarit* VI. Paris, 1970.
 RSD Nordreuil (ed.), *Une bibliothèque au sud de la ville*. Ras Shamra-Ougarit VII. Paris, 1991.
 RSD XIV and D. Arnaud (eds), *Études ougaritiques I. Travaux 1985–1995*. Ras Shamra – Ougarit XIV. Paris, 2001.
 RSD Nordreuil, D. Pardee and R. Hawley, *Une bibliothèque au sud de la ville. Textes 1994–2002 en cunéiforme alphabétique de la Maison d'Ourtenu*. Ras Shamra – Ougarit XVIII. Paris, 2012.
 Ug5 Nougayrol, E. Laroche, Ch. Virolleaud and Cl. F. A. Schaeffer, *Ugaritica* V. Paris, 1968.

Bibliography

- Al-Maqdissi, M., Bahloul, K., Calvet, Y., Callot, O., Matoian, V. and Sauvage, C. (2007) Rapport préliminaire sur les activités de la mission syro-française de Ras Shamra-Ougarit en 2005 et 2006 (65e et 66e campagnes). *Syria* 84, 35–54.
 Al-Maqdissi, M., Calvet, Y., Matoian, V., al-Bahloul, K., Benech, C., Bessac, J.-C., Coqueugniot, E., Geyer, B., Goiran, J.-P., Marriner, N., Onnis, F. and Sauvage, C. (2010) Rapport préliminaire sur les activités de la mission syro-française de Ras Shamra-Ougarit en 2007 et 2008 (67e et 68e campagnes). *Syria* 87, 21–51.
 Amiet, P. (1992) *Corpus des Cylindres de Ras Shamra-Ougarit II, Sceaux-cylindres en hématite et pierres diverses*. Ras Shamra – Ougarit IX. Paris.
 Andersson, E., Felluca, E., Nosch, M.-L. and Peyronel, L. (2010) New Perspectives on Bronze Age Textile Production in the Eastern Mediterranean. The First Results with Ebla as a Pilot Study. In P. Matthiae, F. Pinnock, L. Nigro and N. Marchetti, with the collaboration of L. Romano (eds), *Proceedings of the 6th International Congress on the Archaeology of the Ancient Near East* (Roma, 5th–10th 2008), I, 159–176. Wiesbaden.
 Aruz, J., Benzal, K., and Evans, J. M. (2008) *Catalogue of Exhibition: Beyond Babylon, Art, Trade, and Diplomacy in the Second Millennium BC*. New York.
 Archi, A. (1987) Reflections on the System of Weights from Ebla. In C. H. Gordon, G. A. Rendsburg and N. H. Winter (eds) *Eblaitica: Essays on the Ebla Archives and Eblaite Language*, I, 47–89. Winona Lake.
 Arnaud, D. (1967) Contribution à l'étude de la métrologie syrienne au II^e millénaire. *Revue d'Assyriologie et d'Archéologie orientale* 61, 151–169.
 Ascalone, E. (2006) Tell es-Sultan-Jericho Weight Systems. New Evidence of Weights from Inner Palestine during the Early and Middle Bronze Age. In M. E. Alberti, E. Ascalone and L. Peyronel (eds) *Weights in Context. Bronze Age Weighing Systems of Eastern Mediterranean, Chronology, Typology, Material and Archaeological Context. Proceedings of the International Colloquium, Rome November 22–24 2004*, 161–183. Studi e Materiali-13. Roma.
 Ascalone E. and Peyronel L. (2006a) Early Bronze IVA Weights at Tell Mardikh-Ebla. Archaeological Associations and Contexts. In M. E. Alberti, E. Ascalone and L. Peyronel (eds) *Weights in Context. Bronze Age Weighing Systems of Eastern Mediterranean, Chronology, Typology, Material and Archaeological Context. Proceedings of the International Colloquium, Rome November 22–24 2004*, 49–70. Studi e Materiali-13. Roma.
 Ascalone, E. and Peyronel, L. (2006b) Balance Weights from Tell Mardikh-Ebla during the Middle Bronze Age. In M. E. Alberti, E. Ascalone and L. Peyronel (eds) *Weights in Context. Bronze Age Weighing Systems of Eastern Mediterranean, Chronology, Typology, Material and Archaeological Context. Proceedings of the International Colloquium, Rome November 22–24 2004*, 127–159. Studi e Materiali-13. Roma.
 Astour, M. C. (1973) Ugarit and the Aegean. A Brief Summary of Archaeological and Epigraphic Evidence. In H. A. Hoffner Jr (ed.), *Orient and Occident. Essays Presented to Cyrus H. Gordon on the Occasion of his Sixty-fifth Birthday*, 17–27. Neukirchen-Vluyn.

- Barber, E. J. W. (1991) *Prehistoric Textiles. The Development of Cloth in the Neolithic and Bronze Ages with Special Reference to Aegean*. Princeton.
- Becker, C. (2001) Did the People in Ayios Mamas Produce Purple-dye during the Middle Bronze Age? Considerations on the Prehistoric Production of Purple-dye in the Mediterranean. In H. Buitenhuis and W. Prummel (eds), *Animals and Man in the Past, Essays in honour of Dr A. T. Clason*, 122–134. ARC-Publicatie 41. Groningen.
- Bordreuil, E. (2004) Notices, Poids en forme de taureau, Poids en forme de chèvre, Poids d'un talent, Poids inscrit en forme de taureau. In Y. Calvet and G. Galliano (eds), *Catalogue d'exposition: Le royaume d'Ougarit. Aux origines de l'alphabet*, 50, 51, 136, 139. Paris-Lyon.
- Bordreuil, E. (2006) Preliminary Considerations for a Typology of the Weights of the Late Bronze Age Discovered at Ras Shamra-Ugarit. Archaeological and Textual Data. In M. E. Alberti, E. Ascalone and L. Peyronel (eds) *Weights in Context. Bronze Age Weighing Systems of Eastern Mediterranean, Chronology, Typology, Material and Archaeological Context. Proceedings of the International Colloquium, Rome November 22–24 2004*, 203–232. Studi e Materiali-13. Roma.
- Bordreuil, E. (2007) Numération et unités pondérales dans les textes administratifs et économiques en ougaritique et dans les tablettes métrologiques en cuneiforme suméro-akkadien. In J.-M. Michaud (ed.), *Le royaume d'Ougarit de la Crète à l'Euphrate. Nouveaux axes de recherche*, 381–421. Sherbrooke.
- Bordreuil, E. (2008) Les poids du Palais royal d'Ougarit dans leur contexte archéologique et épigraphique. In V. Matoïan (ed.) *Le mobilier du Palais royal d'Ougarit*, 215–245. Ras Shamra – Ougarit XVII. Lyon.
- Bordreuil, E. (2012) Poids et mesures dans les textes administratifs en ougaritique: unités pondérales et quantification du cuivre. In V. Matoïan, M. Al-Maqdissi and Y. Calvet (eds), *Études ougaritiques II*, 283–296. Ras Shamra – Ougarit XX. Leuven.
- Bordreuil, P. (1989) À propos de la topographie économique de l'Ougarit: jardins du midi et pâturages du nord. *Syria* 66, 263–274.
- Bordreuil, P., Pardee, D. and Hawley, R. (2012) *Une bibliothèque au sud de la ville. Textes 1994–2002 en cuneiforme alphabétique de la maison d'Ourtenu*. Ras Shamra – Ougarit XVIII. Lyon.
- Bounni, A., Lagarce E. and Lagarce, J. (1998) Ras Ibn Hani, I. *Le palais nord du Bronze récent. Fouilles 1979–95, synthèse préliminaire*. Bibliothèque archéologique et historique CLI. Beyrouth.
- Bounni, A., Lagarce, E. and Lagarce J., with the collaboration of S. Rey (2012) Un anniversaire dans l'anniversaire, la campagne de fouilles franco-syrienne à Ras Shamra en 1974: rapport sommaire. In V. Matoïan, M. Al-Maqdissi et Y. Calvet (eds), *Études ougaritiques II*, 57–12. Ras Shamra – Ougarit XX. Leuven.
- Breniquet, C. (2008) *Essai sur le tissage en Mésopotamie des premières communautés sédentaires au milieu du III^e millénaire avant J.-C.*, Paris.
- Breniquet, C. (2010) Weaving in Mesopotamia during the Bronze Age: Archaeology, Techniques, Iconography. In C. Michel and M. L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 52–67. Ancient Textiles Series 8. Oxford.
- Breniquet, C., Tengberg, M. and Andersson, E., with the collaboration of Nosch, M. L. (eds) (2012) Préhistoire des textiles au Proche-Orient. *Paléorient* 38:1–2, 13–157.
- Buchholz, H. G. (1999) *Ugarit, Zypern und Ägäis. Kulturbeziehungen im zweiten Jahrtausend v. Chr.* Münster.
- Burke, B. (1999) Purple and Aegean Textile Trade in the Early Second Millennium BC. In P. P. Betancourt, V. Karageorghis, R. Laffineur and W.-D. Niemeier (eds), *Meletemata I. Studies in Aegean archaeology presented to Malcolm H. Wiener as he enters his 65th year*, 75–82. Aegaeum 20. Annales d'archéologie égéenne de l'Université de Liège et UT-PASP.
- Callot, O. (1994) *La tranchée 'Ville Sud'. Études d'architecture domestique*. Ras Shamra – Ougarit X. Paris.
- Calvet, Y. (2000) Ougarit: les animaux symboliques du répertoire figuré au Bronze récent. In *Les animaux et les hommes dans le monde syro-mésopotamien aux époques historiques*, 447–465. Topoi, supplément 2. Lyon.
- Calvet, Y. (2012) La région d'Ougarit au Bronze Récent. In V. Matoïan, M. Al-Maqdissi and Y. Calvet (eds), *Études ougaritiques II*, 1–10. Ras Shamra-Ougarit XX. Leuven.
- Cardon, D. (2007) *Natural Dyes, Sources, Tradition, Technology and Science*. Londres.
- Caubet, A. (1991) Répertoire de la vaisselle de pierre, Ougarit 1929–1988. In M. Yon (ed.), *Arts et*

- Industries de la pierre*, 205–264. Ras Shamra – Ugarit VI. Paris.
- Caubet, A. (2002) Animals in Syro-Palestinian Art. In B. J. Collins (ed.), *A History of the Animal World in the Ancient Near East*, 211–234. Leiden-Boston-Köln.
- Caubet, A. and Matoïan, V. (1995) Ugarit et l'Égée. In M. Yon, M. Sznycer and P. Bordreuil (eds), *Le pays d'Ougarit autour de 1200 av. J.C., Actes du Colloque International (Paris, 28 juin-1 juillet 1993)*, 99–112. Ras Shamra – Ugarit XI. Paris.
- Chahoud, J. (2013) *Diversité faunique, économie alimentaire et pratiques socio-culturelles au Levant à l'Âge du Bronze: une approche archéozoologique* (thèse de doctorat de l'Université Lumière Lyon 2, inédite).
- Chahoud, J. and Vila, E. (in press) Exploitation of Fauna at Ras Shamra: Case Study of the 'Maison aux albâtres', Late Bronze Age, Northern Levant. In M. Mashkour and M. Beech (eds), *Proceedings of the 9th Meeting of Aswa (15–20 November 2008, Al Ain, Abu DhabiEmirate, United Arab Emirates)*.
- Chanut, C. (2000) *Bois, pierres et métaux à Ugarit-Ras Shamra à l'âge du Bronze Récent. D'après les données des sciences naturelles, de l'archéologie et des textes*, Thèse de doctorat en Philologie et Histoire des religions de l'Orient Ancien, Institut Catholique de Paris, ANRT (Atelier national de reproduction des thèses), Lille.
- Chavane, M.-J. (1987), Instruments de bronze, In M. Yon (éd.), *Le centre de la ville*, 357–374. Ras Shamra – Ugarit III. Paris.
- Cohen, D. (1994) *Dictionnaire des racines sémitiques ou attestées dans les langues sémitiques*, fasc. 2. Paris-Leuven.
- Contenson, de H. (1992) *Préhistoire de Ras Shamra. Les sondages stratigraphiques de 1955 à 1976*. Ras Shamra – Ugarit VIII. Paris.
- Coquino, Y., Bouquillon, A., Leclaire, A. and Matoïan, V. (2008) Le 'four aux tablettes' du locus 153 ('ex-cour V') du Palais royal d'Ougarit: nouvelles données sur le matériel non épigraphique. In V. Matoïan (ed.), *Le mobilier du palais royal d'Ougarit*, 307–326. Ras Shamra – Ugarit XVII. Lyon.
- Cour-Marty M. A. (1990) Les poids égyptiens, de précieux jalons archéologiques. In *Cahier de recherches de l'Institut de Papyrologie et d'Égyptologie de Lille* 12, 17–55, Lille.
- Courtois, J.-C. (1969) La maison du prêtre aux modèles de poumon et de foies d'Ugarit. In J.-C. Courtois (éd.), *Ugaritica* VI, 91–119. Paris.
- Courtois, J.-C. (1979) Ras Shamra. In *Supplément au Dictionnaire de la Bible*, tome IX, 1124–1466. Paris.
- Courtois, J.-C. (1983) Le trésor de poids de Kalavassos-Ayios Dhimitrios 1982, *Report of the Department of Antiquities, Cyprus*, 117–130.
- Courtois, J.-C. (1984) Alasia III, Les objets des niveaux stratifiés d'Enkomi (fouilles C. F. A. Schaeffer 1947–1970). Mission archéologique d'Alasia, VI. Paris.
- Courtois, J.-C. (1990) Poids, prix, taxes et salaires à Ugarit, Syrie, au II^e millénaire. *Res Orientales* 2, 119–127. Paris.
- Courtois, J.-C., Courtois, L. (1978) Corpus céramique de Ras Shamra-Ugarit. Niveaux historiques d'Ugarit. Bronze Moyen et Bronze Récent. In I. Schaeffer de Chalon and A. Schaeffer-Boehling (eds), *Ugaritica* VII, 191–370. Paris.
- Czichon, R. M., Werner, P. (1998) *Tall Munbāqa-Ekalte I. Die bronzezeitlichen Kleinfunde*. Wissenschaftliche Veröffentlichungen der Deutschen Orient-Gesellschaft 98. Saarbrücken.
- Dardaillon, E. (2008) Analyses métallurgiques. In Y. Calvet, M. Yon (ed.) *Ougarit. Au Bronze moyen et au Bronze récent*, 159–168. Travaux de la Maison de l'Orient et de la Méditerranée 47. Lyon.
- Dardaillon, E. (2012) Le plomb dans les productions métalliques d'Ougarit. In V. Matoïan, M. Al-Maqdissi and Y. Calvet (eds) *Études ougaritiques* II, 221–239. Ras Shamra-Ougarit XX, Leuven.
- Dietrich, M. (2010) Trumpet Snails and Purple Snails as an Indication of the Transfer of Religion and Technology in the Eastern-Mediterranean Region. In G. Galil, M. Geller and A. Millard (eds), *Homeland and Exile. Biblical and Ancient Near Eastern Studies in Honour of Bustenay Oded*, 35–57. Leiden.
- Dikaïos, P. (1969–1971) Enkomi Excavations, 1948–1958, Mainz am Rhein.
- Durand, J.-M. (1999) La façade occidentale du Proche-Orient d'après les textes de Mari. In A. Caubet (ed.), *L'acrobate au taureau. Les découvertes de Tell el-Dab'a (Égypte) et l'archéologie de la Méditerranée orientale (1800–1400 av. J.-C.)*, 149–164. Paris.

- Elliott, C. (1991) The Ground Stone Industry. In M. Yon (ed.), *Arts et Industries de la pierre*, 9–99. Ras Shamra-Ougarit VI. Paris.
- Eran, A., and Edelstein, G. (1977) The Weights. In S. Ben-Arieh and G. Edelstein (eds) *Akko Tombs Near the Persian Garden*, 52–62, ‘Atiqot 12, Jerusalem.
- Gachet, J., and Pardee, D. (2001) Les ivoires inscrits du Palais Royal (fouille 1955). In M. Yon and D. Arnaud (eds) *Études ougaritiques I*, 191–230. Ras Shamra – Ougarit XIV. Paris.
- Gleba, M. and Griffiths, D. (2011–2012) Textile Remains from Middle Bronze Age Burial in Sidon. In C. Doumet-Serhal, en collaboration avec A. Rabate and A. Resek (eds), *A tribute to Dr John Curtis on his 65th birthday, Archaeology and History in the Lebanon* 34–35, 284–294.
- Helmer, D. (2012) Étude de la faune du sondage Henri de Contenson à Ras Shamra – Syrie. In V. Matoïan, M. Al-Maqdissi and Y. Calvet (eds), *Études ougaritiques II*, 23–56. Ras Shamra-Ougarit XX. Leuven.
- Heltzer, M. (1976) *The Rural Community in Ancient Ugarit*. Wiesbaden.
- Herda, A. (1996) Rindergestaltige Gewichte der späten Bronzezeit aus griechischen Heiligtümern. *Istanbuler Mitteilungen* 46, 67–82.
- Hirschfeld, N. (2000) Marked Late Bronze Age Pottery from the Kingdom of Ugarit. In M. Yon, V. Karageorghis and N. Hirschfeld, *Céramiques mycéniennes*, 163–200. Ras Shamra – Ougarit XIII. Paris.
- Huehnergard, J. (1987) *Ugaritic Vocabulary in Syllabic Transcription*. Atlanta.
- Huehnergard, J. (1989) *The Akkadian of Ugarit*. Atlanta.
- Huehnergard, J. (1999) The Akkadian Letters. In W. G. E. Watson and N. Wyatt (eds), *Handbook of Ugaritic Studies*, 375–389. Leiden.
- Icart, J.-C., Chanut, C. and Matoïan, V. (2008) Le matériel en pierre du Palais royal d’Ougarit: diagnose, nomenclature, provenance et usage. In V. Matoïan (ed.), *Le mobilier du palais royal d’Ougarit*, 157–190. Ras Shamra – Ougarit XVII. Lyon.
- James, M. A., Reifarth, N. and Evershed, R. P. (2011) Chemical Identification of Ancient Dyestuffs from Mineralized Textile Fragments from Royal Tomb. In P. Pfälzner (ed.), *Interdisziplinäre Studien zur Königsgruft von Qatna*, 449–467. Qatna Studien 1. Wiesbaden.
- Joukowsky, M. S. (1985), Four Mesopotamian Weights. In T. Hackens and R. Winkes (eds) *Love for Antiquity. Selections from the Joukowsky Collection*, 11–12, Archaeologia Transatlantica VII, Louvain-la-Neuve – Providence.
- Karageorghis, V. (2011) *Enkomi, The Excavations of Porphyrion Dikaios 1948–1958. Supplementary Catalogue of Finds*. Nicosia.
- Kogan, L. (2011) Proto-Semitic lexicon. In S. Weninger (ed.), *The Semitic Languages. An International Handbook*, 179–258. Berlin-Boston.
- Lackenbacher, S. (2002) *Textes akkadiens d’Ougarit*. Paris.
- Linseele, V. (2010) Étude faunique sur le site de Tell Tweini. In M. Al-Maqdissi, K. Van Lerberghe, J. Bretschneider and B. Massoud (eds), *Tell Tweini. Onze campagnes de fouilles syro-belges (1999–2010)*, 153–160. Damas.
- Liverani, M. (1989) Economy of Ugaritic Royal Farms. In C. Zaccagnini (ed.), *Production and Consumption in the Ancient Near East*. 127–168. Budapest.
- Malbran-Labat, F. (1999) Langues et écritures à Ougarit. *Semitica* 49, 65–101.
- Malbran-Labat, F. (2000) Les textes akkadiens découverts à Ougarit en 1994. In K. Van Lerberghe and G. Voet (eds), *Languages and Cultures in Contact. At the Crossroads of Civilizations in the Syro-Mesopotamian Realm*, 237–244. Leuven.
- Malbran-Labat, F. (2008) Catalogue raisonné des textes akkadiens de la ‘Maison d’Urtênu’. In C. Roche (ed.), *D’Ougarit à Jérusalem. Recueil d’études épigraphiques et archéologiques offert à Pierre Bordreuil*, 159–166. Paris.
- Malbran-Labat, F. and Roche, C. (2012) Les chevaux en Ougarit : élevage et commerce. In V. Matoïan, M. Al-Maqdissi and Y. Calvet (eds), *Études ougaritiques II*, 275–281. Ras Shamra – Ougarit XX. Leuven.
- Mallet J. and Matoïan V. (2001) Une maison au sud du ‘temple aux rhytons’ (fouille 1979–1990). In M. Yon and D. Arnaud (eds), *Études ougaritiques I*, 83–190. Ras Shamra-Ougarit XIV. Paris.
- Marcus, E. and Artzy, M. (1995) A Loom Weight from Tel Nami with a Scarab Seal Impression. *Israel Exploration Journal* 45, 136–149.
- Marchegay, S. (1999) *Les tombes de Ras Shamra-Ougarit (Syrie) au II^e millénaire avant J.-C.: architecture, localisation, relation avec l’habitat*. Thèse de doctorat, Université Lumière/Lyon 2

- (unpublished).
- Marchegay, S. (2001) Un plan inédit des fouilles de Minet el-Beida. In M. Yon and D. Arnaud (eds), *Études ougaritiques* I, 11–40. Ras Shamra-Ougarit XIV. Paris.
- Margueron, J.-C. (1979) Existe-t-il des ateliers dans les palais orientaux de l'Age du Bronze? *Ktema* 4, 3–25.
- Márquez Rowe, I. (1995) More evidence of the Grazing Tax in Ugarit. *Ugarit-Forschungen* 27, 317–331.
- Márquez Rowe, I. (2006) *The Royal deeds of Ugarit. A Study of Ancient Near Eastern Diplomats.* Münster.
- Matoian, V. (2000) *Ras Shamra-Ougarit et la production des matières vitreuses au Proche-Orient au second millénaire avant Jésus-Christ.* Paris (thèse de l'université de Paris I Pantéon-Sorbonne, unpublished).
- Matoian, V. (ed.) (2008) *Le mobilier du Palais royal d'Ougarit.* Ras Shamra – Ougarit XVII. Lyon.
- Matoian, V. (2012) Données récentes sur les céramiques avec 'marques' d'Ougarit. In V. Matoian, M. Al-Maqdissi and Y. Calvet (eds), *Études ougaritiques* II, 123–157. Ras Shamra – Ougarit XX. Leuven.
- Matoian, V., Al-Maqdissi, M., Al-Bahloul, K., Asensi-Amorós, V., Benech, C., Bessac, J.-C., Bordreuil, E., Carbillet, A., Carbonel, P., Dardaillon, E., Geyer, B., Goiran, J.-P., Hawley, R., Herveux, L., Huang, X., Kanhoush, K., Marriner, N., Onnis, F., Pardee, P., Rejiba, F., Roche-Hawley, C. and Sauvage, C. (2013) Rapport préliminaire sur les activités de la mission archéologique syro-française de Ras Shamra – Ougarit en 2009 et 2010 (69e et 70e campagnes). *Syria* 90, 435–475.
- Matoian, V. and Vita, J.-P. (2009) Les textiles à Ougarit: perspectives de la recherche. *Ugarit-Forschungen* 41, 469–504.
- Merrillees, R. (2003) The First Appearances of Kamare Ware in the Levant. *Egypt and the Levant* XIII, 127–142.
- Militello, P. (2007) Textile Industry and Minoan Palaces. In C. Gillis and M.-L. B. Nosch (eds), *Ancient Textiles, Production, Craft and Society, Proceedings of the First Conference on Ancient Textiles (Lund and Copenhagen, March 2003)*, 36–45. Oxford.
- Monchambert J.-Y. (2013) La résidence nord à Ougarit. Les fouilles complémentaires effectuées entre 1999 et 2005. In V. Matoian and M. Al-Maqdissi (eds), *Études ougaritiques* III, 73–88. Ras Shamra – Ougarit XXI, 73–88. Paris – Leuven – Walpole, MA.
- Monloup, Th. (1987) Les figurines en terre cuite. In M. Yon (ed.), *Le Centre de la Ville, 38e-44e campagnes (1978–1984)*, 307–328. Ras Shamra – Ougarit III. Paris.
- Morandi Bonacossi, D. (2011) The Middle Bronze Age Necropolis at Mishrifeh. In P. Pfälzner (ed.), *Interdisziplinäre Studien zur Königsgruft von Qatna*, 11–37. Qatna Studien 1. Wiesbaden.
- Oates, D., Oates, J., McDonald, H. (2001), *Excavations at Tell Brak. Vol. 2: Nagar in the Third Millennium BC*, Oxford.
- Olivier, J.-P. (2007) Édition holistique des textes chypro-minoens. Pisa-Rome.
- Olmo, G. del (1993) Sheep and Goats at Ugarit: Alphabetical Texts, *Bulletin on Sumerian Agriculture VII. Domestic Animals of Mesopotamia. Part I*, 183–197. Cambridge.
- Olmo, G. del (2007) 'gdlt/dqt: ¿ganado o pan como materia sacrificial?', *Aula Orientalis* 25, 169–173.
- Pardee, D. (2000a) *Les textes rituels.* Ras Shamra Ougarit XII. Paris.
- Pardee, D. (2000b) Animal Sacrifice at Ugarit. In *Topoi, supplément 2, Les animaux et les hommes dans le monde syro-mésopotamien aux époques historiques*, 321–331. Lyon.
- Pardee, D. (2000c) Trois comptes ougaritiques. RS 15.062, RS 18.024, RIH 78/02. *Syria* 77, 23–67.
- Pardee, D. (2007) RS 18.028 et le palais royal d'Ougarit comme acheteur de biens. *Syria* 84, 57–68.
- Parise, N. F. (1970–1971) Per uno studio del sistema ponderale ugaritico. *Dialoghi di Archeologia* 1, 3–36.
- Peyronel, L. (2004) *Gli strumenti di tessitura dall'età del Bronzo all'epoca persiana.* Materiali Studi Archeologici di Ebla IV. Rome.
- Peyronel, L. (2006) Il ruolo della porpora nell'industria tessile siro-palestinese dell Bronzo tardo e dell'età del Ferro. Le evidenze storico-archeologiche dei centri costieri. *Rivista di Studi Fenici* XXXIV-1, 49–70.

- Pulak, C. M. (1996) *Analysis of the Weight Assemblages from the Late Bronze Age Shipwrecks at Uluburun and Cape Gelidonya, Turkey*, PHD dissertation, Texas A&M University.
- Rahmstorf, L. (2006) In Search of the Earliest Balance Weights, Scales and Weighing Systems from the East Mediterranean, the Near and Middle East. In M. E. Alberti, E. Ascalone and L. Peyronel (eds) *Weights in Context. Bronze Age Weighing Systems of Eastern Mediterranean, Chronology, Typology, Material and Archaeological Context. Proceedings of the International Colloquium, Rome November 22–24 2004*, 9–45. Studi e Materiali-13. Roma.
- Reifarth, N. and Drewello, R. (2011) Textile Spuren in der Königsgruft Vorbericht zu ersten Ergebnissen und dem Potential zukünftiger Forschungen. In P. Pfälzner (ed.), *Interdisziplinäre Studien zur Königsgruft von Qatna*, 469–482. Qatna Studien 1. Wiesbaden.
- Reifarth, N., Drewello, U. and Drewello, R. (2011) Die Textilien vom Bestattungstisch in Kammer 4 Vorbericht zu den mikrostratigraphischen und tewtilechnologischen Untersuchungen. In P. Pfälzner (ed.), *Interdisziplinäre Studien zur Königsgruft von Qatna*, 499–523. Qatna Studien 1. Wiesbaden.
- Ribichini, S. and Xella, P. (1985) *La terminologia dei tessili nei testi di Ugarit*. Roma.
- Saadé, G. (1995) Le port d'Ougarit. In M. Yon, M. Sznycer and P. Bordreuil (eds), *Le Pays d'Ougarit autour de 1200 av. J.-C. (Actes du Colloque International Paris, 28 juin-1 juillet 1993)*, 211–226. Ras Shamra – Ougarit XI. Paris.
- Sanmartín, J. (1993) Sheep and Goats in the Akkadian Economic Texts from Ugarit, *Bulletin on Sumerian Agriculture VII. Domestic Animals of Mesopotamia. Part I*, 199–207. Cambridge.
- Sauvage, C. (2012) Spinning from Old Threads: The Whorls from Ugarit at the Musée d'Archéologie Nationale (Saint-Germain-en-Laye) and at the Louvre. In M.-L. Nosch, H. Koefoed and E. Andersson Strand (eds), *Textile Production and Consumption in the Ancient Near East, Archaeology, Epigraphy, Iconography*, 189–214. Ancient Textiles Series 12. Oxford.
- Sauvage, C. and Hawley, R. (2013) Une fusaiole inscrite d'Ougarit conservée dans les collections du MAN. In V. Matoian and M. AL-Maqdissi (eds) *Etudes ougaritiques*. Ras Shamra – Ougarit XXI, 365–394. Paris-Leuven-Walpole, MA.
- Schaeffer, C. F. A. (1931) La deuxième campagne de fouilles à Ras Shamra (printemps 1930). *Syria* 12, 67–77.
- Schaeffer, C. F. A. (1932) Les fouilles de Minet el Beida et de Ras Shamra. Troisième campagne. *Syria* 13, 1–27.
- Schaeffer, C. F. A. (1951) Une Industrie d'Ougarit : la pourpre. *Annales archéologiques de Syrie* I-2, 188–192.
- Schaeffer, C. F. A. (1954) Les fouilles de Ras Shamra-Ugarit, quinzième, seizième et dix-septième campagnes (1951, 1952 and 1953). Rapport sommaire. *Syria* 31, 14–67.
- Schaeffer, C. F. A. (1983) *Corpus I des cylindres-sceaux de Ras Shamra-Ugarit et d'Enkomi-Alasia*. Paris.
- Singer, I. (2008) Purple-dyers in Lazpa. In B. Jean Collins, M. R. Bachvarova and I. C. Rutherford (eds), *Anatolian Interfaces. Hittites, Greeks and Their Neighbours*, 21–43, Oxford.
- Stieglitz, R. R. (1979) Commodity Prices at Ugarit. *Journal of the American Oriental Society* 99, 15–23.
- Stieglitz, R. R. (1994) The Minoan Origin of Tyrian Purple. *Biblical Archaeologist* 57:1, 46–54.
- Tropper, J. (2001) Brot als Opfermaterie in Ugarit. Eine neue Deutung von der Lexeme *dqt* und *gdlt*. *Ugarit-Forschungen* 33, 345–365.
- Van Soldt, W. H. (1989) Labels from Ugarit. *Ugarit-Forschungen* 21, 375–388.
- Van Soldt, W. H. (2005) *The Topography of the City-State of Ugarit*. Münster.
- Vidal, J. (2005) Las aldeas de Ugarit según los archivos del Bronce Reciente (siglos XIV-XII a.n.e.). Sabadell.
- Vila, E. (2008) L'économie alimentaire carnée et le monde animal. Analyse préliminaire des restes osseux de mammifères (Ras Shamra). In Y. Calvet, M. Yon (ed.), *Ougarit au Bronze Moyen et au Bronze Récent*, Travaux de la Maison de l'Orient 47, 169–179. Lyon.
- Vita, J.-P. (1997) Remarques épigraphiques à propos de quatre textes ougaritiques. *Ugarit-Forschungen* 29, 705–707.
- Vita, J.-P. (2010) Textile Terminology in the Ugaritic Texts. In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC.*, 323–337. Oxford.
- Watson, W. G. E. (2007), *Lexical Studies in Ugaritic*, Sabadell.

- Watson, W. G., Drewello, E. and Wyatt, N. (eds) (1999), *Handbook of Ugaritic Studies*, Leiden-Boston-Köln.
- Yon, M. (1997) *La cité d'Ougarit sur le tell de Ras Shamra*. Paris.
- Yon, M. (2006) *The Royal City of Ugarit*. Winona Lake.
- Yon, M. and Callot, O. (1997) L'habitat à Ougarit à la fin du Bronze récent. In C. Castel, M. Al-Maqdissi and F. Villeneuve (eds), *Les maisons dans la Syrie antique du III^e millénaire aux débuts de l'Islam*, 15–28. Bibliothèque archéologique et historique CL. Beyrouth.

1 On Ugarit see e.g. Yon 1997; 2006; Watson and Wyatt 1999; www.ras-shamra.ougarit.mom.fr.

2 Since 1999, the Ras Shamra mission has remained under the joint tutelage of the French Ministry of Foreign Affairs and the General Direction of Antiquities and Museums of Syria. Ongoing interdisciplinary research work within the framework of a four-year programme (2009–2012) seeks to identify and define the characteristics of Mediterranean cities in Syria in the Bronze Age based on the study of the city and surroundings of Ugarit.

3 This interdisciplinary approach, which has only just been introduced, has resulted in the first publication: Matoian and Vita 2009. With regards to the Bronze Age periods for the Syrian area previous to those documented by the Ugarit material, we shall refer to the international project concerning textile production in Ebla in Early and Middle Bronze Age (Andersson *et al.* 2010).

4 Helmer 2012.

5 Alphabetic and syllabic texts from Ugarit attest to terms for different types of goats: z and its ideographic equivalent (UDU).ŪZ (DUL 196: 'caprine animal, kid, goat'; Olmo 1993, 191; Sanmartín 1993, 200, 203), y'l 'mountain goat' (DUL 947; Olmo 1993, 186). See also *drh* 'mountain goat(?)' (DUL 281). A clerical syllabic text notes down 127 goat hides (RS 21.203, PRU 6 no. 122; Sanmartín 1993, 207); the Aqhatu epic mentions 'the horns of mountain goat' as some of the material a bow worthy of goddess 'Anatu must be made of (1.17:VI:22; cf. also DUL 711; Olmo 1993, 196).

6 Vila 2008, 172: "Les moutons de Ras Shamra sont des animaux d'une taille moyenne, supérieure à celle des moutons du Bronze ancien de la Syrie du nord et de l'Anatolie, et comparable à celle des moutons du Bronze récent de Kamid-el-Loz et de Lidar Höyük. Ils sont plus petits en revanche que les quelques exemplaires provenant de Tell Seh Hamad sur le Khabour. La taille moyenne à Ougarit est de 71 cm au garrot, avec des mâles qui peuvent atteindre une taille de plus de 80 cm et des femelles de bien plus petite taille (62 cm au garrot). La grande amplitude de taille marquée également à Kamid-el-Loz et à Lidar Höyük évoque la présence éventuelle de types différents de moutons à cette période sur ces sites".

7 We are deeply grateful to the authors for allowing us to take into consideration the results of their study of the material in the so-called 'Maison aux albâtres' (excavations by E. and J. Lagarce); Chaoud and Vila, in press.

8 "(...) the sheep culling profile shows high frequencies of individuals between 2 and 6 years old and older, evidence for consumption of animals produces from management focused on "final products" (...): meat (...) but also wool exploitation".

9 Studies are being conducted by Linseele (2010) for Tell Tweini. For the fauna of Tell Kazel, see Chaoud 2013.

10 Contenson 1992, p. 118–119, fig. 146: 7 (H. 3.7 cm). Pt SH 99, 5,30 m.

11 The object is unpublished and housed in the National Museum of Damascus (L. 3.6 cm; la 3.1 cm; H. 1.6 cm).

12 Galliano and Calvet 2004, 39, n. 17: level II of Ras Shamra.

13 See the contribution by E. Vila and D. Helmer in this volume.

14 Representations of the fleece are exceptional. In the Ras Shamra corpus, it can be observed on a goat depicted on a cylinder classified by P. Amiet within the proto-Syrian series (Amiet 1992, no.13).

15 Calvet 2000.

16 Schaeffer 1983, RS 6.213.

17 Schaeffer 1983, RS 10.054.

18 Schaeffer 1983, RS 7.190.

19 Schaeffer 1983, RS 11.201, RS 14.154.

20 While the iconographic repertoire includes figures of bulls (the most frequent), cows, calves, horses, asses or dogs, no sheep are depicted.

21 Vila 2008, 178.

22 The same applies to Tell Tweini, Linseele 2010.

23 Pardee 2000a; 2000b.

24 RS 8.172, see *infra* the appendix by E. Bordreuil.

25 Pouring spout of a ceramic painted beaker in the shape of a ram's head (RS 84.5105: Monloup 1987,

315, no.5); fragment of a miniature chlorite bowl (?) with relief decoration of grooved horns (RS 9.267: Caubet 1991, 215 and 226, pl. VII, 9 and XII, 4); fragment of a faience cup in the shape of a ram's head (Matoian 2000).

26 Courtois 1969; Gachet and Pardee 2001.

27 RS 19.116:4 (PRU 6, no. 120).

28 UDU: passim. UDU.NÍTA: RS 19.116 (PRU 6, no. 120; Huehnergard 1989, 406; Sanmartín 1993, 200–201).

29 RS 1957.4 (AnOr 48, 27; Huehnergard 1989, 74, 406; Sanmartín 1993, 200). Márquez Rowe 1995, 330, suggests the alternative reading *udu ugu*; the text would therefore read “a debt-note of 68 sheep owed by a certain Iliyanu from ‘Ilištam’u”.

30 RSO XIV no. 42:10' and RSO XVIII, no. 48 :7 must now be added to the texts compiled in DUL 775.

31 RS 34.163:12.13 (RSO VII no. 39)

32 RS 15:120:13.18 (PRU 3 57; Sanmartín 1993, 202; Huehnergard 1989, 77: “probably intended for *u8-udu-hi-a* (*usduḥa*) = *šcnu* ‘flock’”.

33 RS 17.136 (PRU 6, no. 117), RS 19.116 (PRU 6, no. 120).

34 Huehnergard 1989, 77, 406; also Malbran-Labat 1999, 93.

35 ram: *a/il*, *kr*, *š*; ewe: *dqt*, *hprt*, *šin*, *taṭ*, *laḥru*.

36 For instance ‘suckling (lamb or kid)’ (*llu*), ‘a yearling lamb’ (*phd*).

37 For instance *imr* *dh* ‘sacrificial lamb’ (DUL 73), *mri ilm* ‘fat rams’ (DUL 47), *kukallu* ‘fat-tailed sheep’.

38 E.g. *imr* (mythical, incantation), *hprt* (mythical).

39 *dqt*: DUL 279, ‘Sheep, ewe, for sacrificial use’, Tropper 2001, ‘dünnes Brot’ (see in this respect, reply from del Olmo 2007).

40 4.80:20: 60 sheep; RS 18.258 (4.417):7: 44 (according to reading and collation by Vita 1997, 706); RS 18.258 (4.417):18: 7; RS 17.312 (4.295):2: 8; RS 17.312 (4.295):14: 30; RS 17.312 (4.295):17: 10. The syllabic text RS 20.01 (Ug 5 no. 95) contains figures of dubious reading and interpretation.

41 In letter RS 34.163:12–15 (RSO VII no. 39), one private person announces to another the dispatch of the 200 ewes as requested (*u8-udu-hi-a*); see also Malbran-Labat and Roche 2012, 277. In letter RS 17.142 (PRU 6 no. 4), one private person announces to another the dispatch of ten sheep (nevertheless, it is not certain that this letter was written in Ugarit, cf. also Huehnergard 1999, 387).

42 On some occasions, the owning of sheep could be complemented by owning oxen and asses. Sheep and oxen: RS 17.312 (4.295):2.13–14.17; RS 18.258 (4.417):7 (for the reading of the line, with restoration of *šin*, see Vita 1997, 706); RS 20.01 (Ug 5 no. 95). Sheep, oxen and asses: RS 16.295:6 (PRU 3 pp. 70–71); RS 15.109+:4 (PRU 3 pp. 102–105); RS 16.132:22 (PRU 3 pp. 140–141).

43 del Olmo 1993, 193. See Heltzer 1976, 44.

44 Vidal 2005, 85.

45 Bordreuil 2012, 284.

46 RS 18.024 (4.337):22, 9 sheep for 9 shekels (this text was re-edited by Pardee 2000c, 41–56); RS 18.028 (4.341):9, 10 sheep = 6 shekels + 1 *kmsk*, where 1 *kmsk* = $\frac{1}{3}$ as shown by Pardee 2007, 61: “dix (têtes de) petit bétail pour six (sicles d’argent) et un tiers”, that is, $\frac{2}{3}$ of a shekel per unit (Pardee, *ibid.* 62); regarding this term see also Bordreuil, Pardee and Hawley 2012, 107.

47 RS 15.023 (4.142):2.

48 RS 15.023 (4.142):1.3.

49 The meaning of the term *šst* is, however, debatable; see DUL 772 ‘baseboards, floor (of a chariot)’ and discussion in Pardee 2000c, 32–33; in p. 25 line 6 is translated as ‘2 juments pour 70 (sicles la tête)’.

50 RS 16.155 (PRU 3, 205). As Nougayrol suggests, *ibid.* n. 2, this tablet must be the continuation of another unfound tablet. As Huehnergard indicates, 1989, 74 n. 160, line 8 must be read *šu-nigin-na* = *napharu* ‘sum, total’, instead of *šu-ku-na* ‘in deposit’ (thus Nougayrol).

51 RS 17.37 (PRU 6 no. 115): 113 sheep (*udu*); RS 17.136 (PRU 6 no. 117): 68 (*gug-gal*); RS 19.141 (PRU 6 no. 121): 201 + 38 + 63(?) (*udu*); RS 1957.4 (AnOr 48 27): 68 (*udu-nim-ma*; or else *udu*, see Márquez Rowe 1995, 330); RS 16.290 (PRU 3 p. 188): 94 (*udu*). RS 19.116 (PRU 6 no. 120) mentions categories *udu-u8* and *udu-níta*. According to Márquez Rowe 1995, 330, text RS 19.37 (4.616) may perhaps allocate 1000 sheep and goats to the locality of Tibaqu (see also, however, van Soldt 2005, 23 n. 166: ‘Possibly a personal name’).

52 Place names refer to localities both in the east (RS 18.258 [4.417]:7: *Yaparu*; RS 16.290:3 [PRU 3, 188]: *Ma’qabu*, following the reading [^u]*ma-qa-^u bi* by van Soldt 1989, 379; cf. both toponyms in van Soldt 2005, 97, Group 4) and in the northwest of the kingdom (RS 11.778 [4.80]:18: *Tulhanā*, van Soldt 2005, 104, Group 1, RS 17.312 [4.295]:1.12.15: ‘*Apsunā(yu)*, *Qaratu* and *Yakuna’mu* respectively, van Soldt 2005, 104, Group 1). RS 1957.4:3 [AnOr 48 27] mentions ‘*Ilištam’u*, located in

the centre of the kingdom (van Soldt 2005, 93). Ritual RS 24.249 (1.105):9 mentions a ram (š) linked to the locality of 'Itqb, of uncertain location (van Soldt 2005, 111). Concerning the relevance of the northern part of the kingdom of Ugarit in stockbreeding, see also Bordreuil 1989.

⁵³ *Maqqadu*-tax has been analysed by Márquez Rowe 1995, who defines it as "an *urban*-tax, owed thus by the different members of the community who grazed their flocks on the pasture lands,... that it was owed to the king on account of the permission he gave them to let their flocks graze on his pasture lands,... the King could grant this right to a third person" (Márquez Rowe 1995, 322). Concerning text RIH 78/19 (4.775), which records the grazing tax collected from a certain village, see Márquez Rowe 1995, 326–329 and Vidal 2005, 83–84. Some instances of exemptions are recorded in legal texts RS 16.269 (PRU 3, 69; cf. also Márquez Rowe 2006, 135, 246 n. 127) and RS 16.132 (PRU 3, 140–141). Conclusions reached by Márquez Rowe 1995 have been partially revised by Vidal 2005, 88–89. According to the latter, the *maqqadu*-tax could also be in exceptional cases paid in silver. It was a separate tax on the flocks owned by each person and it was levied based on larger groups (hamlets or professional groups).

⁵⁴ See also the following texts, already pointed out by Márquez Rowe 1995, 330–331: RS 16.155 (PRU 3, 205, mentioned above), RS 17.37 (PRU 6 no. 115), RS 19.141 (PRU 6 no. 121), RS 1957.4 (AnOr 48 27).

⁵⁵ Cf. DUL 639 *nqd* 'head shepherd, chief shepherd'; *ibid.* 727 sub *r'y* (I) 'shepherd'. See also del Olmo 1993, 191–192; Sanmartín 1993, 205–206. The persons mentioned in the two texts RS 16.290 (PRU 3, 188: 94 sheep in the care of [ŠU] two persons; see also van Soldt 1989, 379, Márquez Rowe 1995, 331) and RS 17.136 (PRU 6 no. 117: 68 sheep in the care of [šu] one person) must have been, in all probability, shepherds. In RS 18.087 (4.378) the shepherds (*r'ym*) receive wool (see also Vidal 2005, 85).

⁵⁶ Concerning pluckers (*gzzm*) see later sub §2.1. See also *trbš* 'yard' (DUL 877; Olmo 1993, 191).

⁵⁷ Cf. RS 14.176 (4.128):2: *šin mrat* 'fattened ewe(s)', RS 86.2247:10': *šin m[ra] t* (DUL 775).

⁵⁸ As already noted by Olmo 1993, 191.

⁵⁹ Breniquet 2008, 269–324.

⁶⁰ Cf. Matoian and Vita 2009, 476.

⁶¹ Matoian and Vita 2009, 476.

⁶² Ug. *ptt*, Akk. RS *gada(-meš)* = *kitû*; Huehnergard 1989, 363; van Soldt 1990, 325–329; DUL 688.

⁶³ Concerning sheep by-products in Ugarit, both directly and indirectly, see Sanmartín 1993, 206–207; Olmo 1993, 193; Calvet 2012, 5.

⁶⁴ DUL 799, 2: 'woollen textile': < Sem. *š(š/s)a'ar(t)-* (Kogan 2011, 223; AHw 1191; Huehnergard 1987, 183), cf. Ug. *š'r* (DUL 798: 1) 'hair, hairs', 2) 'pelisse, fleece'; Tropper 2008, 117: 'Haar, Vlies, Schafsfell', Heb. *šā'arāh* (Gesenius 17, 790: 'Haar'), Akk. *šārtu* (AHw 1191: 'Haare, behaarte Haut, Fell') (cf. DUL 799; Tropper 2008, 117). Tropper 2008, 117: 'Haar, Schurwolle'.

⁶⁵ RS 19.104:5 (PRU 6, 128): 1 *túg šā-ḥar-tu* (Huehnergard 1987: 183; van Soldt 1991: 330 n. 158; Olmo 1993: 194–195; Sanmartín 1993: 207; CAD Š/1 81: 'a garment').

⁶⁶ Huehnergard 1989, 407; van Soldt 1990, 333; DUL 799.

⁶⁷ RS 23.028:14 (4.721); Ribichini and Xella 1985, 16: "forse 'lana egiziana'", DUL 800: 'Egyptian(?) wool'. The line is damaged, it could have registered just one talent or maybe more than one. Syllabic text RS 15.135:12 (PRU 3, 206c) notes down 3 *túgqa-qa-ru*, where *qaqqaru* may also be a type of wool, cf. CAD Q, 124 ('a type of wool or garment'; in Vita 2010, 334, erroneously 'CAD K 124'). See also later concerning *š'rt štt* (§2.4).

⁶⁸ DUL 315; Cohen 1994, 110; Vidal 2005, 87.

⁶⁹ Matoian and Vita 2009, 475. Liverani 1989, 151, estimated that 700 to 900 grams was the amount of wool a sheep could yield in Ugarit.

⁷⁰ See already regarding this Ribichini and Xella 1985, 16; Vidal 2005, 86–87; DUL 800.

⁷¹ Bordreuil 2012, 284: in Ugarit, 1 talent = 3000 shekels, 1 shekel = 9.4 g.

⁷² RS 21.184A (4.707):17–18.

⁷³ RS 21.184A (4.707):15–16.

⁷⁴ RS 18.28 (4.341):14.

⁷⁵ RS 15.62 (4.158):17–18.

⁷⁶ See also van Soldt 1990, 332; Pardee 2000c, 38.

⁷⁷ RS 18.28:4 (4.341). Concerning the seven talents of wool measured according to the Ashdod talent mentioned in text RS [Varia 13] (4.709), see the fresh study of the document conducted by E. Bordreuil 2007, 389–397, as well as *id.* 2012, 285 with n. 9. See also the request of one talent of wool in syllabic text RS 86.2236 (RSO XIV no. 6; according to the editor, a text originating in Karkemiš or in a town in northern Syria).

⁷⁸ RS 18.048:9 (4.358); DUL 328.

79 DUL 671.

80 RS 5.179, found by C. Schaeffer in the Acropolis (Sauvage 2012, 189; Sauvage and Hawley 2013).

81 See also Matoian and Vita 2009, 477–481. See C. Elliott for a first approach to stone material (Elliott 1991) and J. Gachet-Bizollon for bone and ivory material (Gachet-Bizollon 2007). C. Sauvage has recently proposed that some ivory objects should be identified as parts of distaffs (Sauvage 2012, 205–208); the author suggests in particular the existence of kits consisting of a spindle, a spindle-whorl and a grenade-shaped component (Gachet-Bizollon 2007, cat. 137) which could have been used as a spindle or as a distaff. This is an interesting hypothesis. However, we should investigate why such an artefact may have been manufactured to be used alternatively for two processes which are usually concomitant. On the other hand, we do not support the hypothesis put forward by the author suggesting that a group of objects made of stone and faience (RS 18.143 and RS 18.150) found in the Royal Palace of Ugarit should also be interpreted as a ‘spinning kit’ (Sauvage 2012, 209). Indeed, the author does not take into consideration certain facts. Firstly, the find does not consist of just one but two flat-convex discoid elements made of stone (Coquinot *et al.* 2008, 318). Secondly, the faience knob has a cavity (for securing it) whose diameter (2 cm) is clearly wider than that of the perforation of the stone elements (1.32 cm in diameter at the most), which seems to exclude a possible link between these elements as part of a ‘spinning kit’ as defined by the author.

82 Elliott 1991; Matoian and Vita 2009; Sauvage 2012.

83 Note 84. See also Bounni *et al.* 2012, fig. 103, cat. 098: excavators interpret the object as a biconic bead though it could be spindle-whorl (for parallels see above all Cyprus material from Enkomi: Dikaios 1969–1971; Courtois 1984; Karageorghis 2011). See also hypothesis put forward by C. Sauvage (Sauvage 2012, 195–196, fig. 11.8).

84 As we have pointed out, up to present, documentation did not specify the weight of the objects despite this being a determining factor. See, from this point of view, the recent study by C. Sauvage on the objects from the Musée de Saint-Germain-en-Laye and the Musée du Louvre (2012).

85 Elliott 1991, 58; Icart, Chanut and Matoian 2008, 170–171.

86 For a typology of spindle-whorls from Ras Shamra see Elliott 1991. We have also identified a steatite lenticular-shaped specimen amongst the inventories (RS 23.69), originating in locus 10 of House B block XIII of ‘Ville Sud’.

87 A steatite spindle-whorl 8.5 cm in diameter and 3.2 cm high was found in locus 11 of House B of block XIII of the ‘Ville Sud’. Contra Sauvage 2012, 192, who states a maximum 6.35 cm diameter.

88 See, for example: Bounni *et al.* 2012, 71, fig. 59, cat. 049. The engraved spindle-whorl mentioned *supra* (cf. note 79) also belongs in this category. This type of decoration is also attested to on a dome-shaped spindle-whorl made of terracotta, found in one of the rooms of the so-called ‘Quartier égéen’ (locus 27 of House B of the western block in this quarter).

89 Elliott 1991, 43, fig. 21, 8, 13.

90 Regarding marks on vessels see Hirschfeld 2000 and Matoian 2012.

91 Courtois and Courtois 1978, 291 fig. 32:8; also Matoian 2012, fig. 3.

92 Regarding excavations conducted under the direction of M. Yon, see references quoted in Matoian and Vita 2009. On 1974 excavations, directed by A. Bounni, E. and J. Lagarce, see Bounni *et al.* 2012.

93 A similar installation has also been found in Minet el-Beida (Schaeffer 1931, pl. XIV:4).

94 Callot 1994, 190.

95 Malbran-Labat 2000, 239; 2008, 25 (RS 94.5013), 28 (RS 94.2562); Lackenbacher and Malbran-Labat, forthcoming.

96 van Soldt 1990, 342–343; DUL 93 (add RS 94.2276:12’ [RSO XVIII no. 47]; RS 94.2603:17 [RSO XVIII no. 52, parallel to *phm* and in relation with *ktn*]; RS 94.2580:12 [RSO XVIII no. 62], parallel to *phm*); Bordreuil, Pardee and Hawley 2012, 217; Dietrich 2010, 46–47 (analyzes *takiltu* as “a nominal derivative in the form *taprist* for nomina actionis of the D-Stem... from the root *ekēlu*” and, consequently, suggests transcribing the term as *tākiltum*).

97 van Soldt 1990, 341–342; DUL 668 (add RS 94.2603:16 [RSO XVIII no. 52, parallel to *phm* and in relation with *ktn*]; RS 94.2580:11 [RSO XVIII no. 62], parallel to *ignu*); Bordreuil, Pardee, and Hawley 2012, 228. *śīg-sag-gil-mud* / *ḥašmānu*: RS 34.134:15, Arnaud 1991, 68 (also van Soldt 1990, 339; Dietrich 2010, 47).

98 Dietrich 2010, 46.

99 van Soldt 1990, 343–344; Huehnergard 1989, 282; DUL 831; Dietrich 2010, 48.

100 RS 20.19:9 (Ug 5 no. 48).

101 van Soldt 1990, 340, 344. A possible Hittite term, cf. DUL 398 (‘type or color of cloth’), Dietrich 2010, 47 and 48–49: “a yellow-green colouring is presupposed. The lemma should be as follows: ‘purple wool like the *ḥandala*-plant’, literally, ‘purple wool of the *ḥandala*-plant’”.

102 RS 20.19:10 (Ug 5 no. 48).

- 103 'Yellowy-brown shade of purple', as proposed by Dietrich 2010, 49–50; the author also suggests a Luwian origin for the term, where *siḡ-za-gin*: *dupašši* = 'purple wool of the *duwa*-type'. See also van Soldt 1990, 340, 344.
- 104 RS 34.180,4, rev. 3': reading *ḥa-se-er-ti* according to van Soldt 1990, 338, followed by Dietrich 2010, 50. According to Huehnergard 1989, this text could be a tribute list probably written at Hattusas.
- 105 van Soldt 1990, 338 n. 118, 344: 'green(?)', Dietrich 2010, 50: 'yellowish-green(?)'. According to Watson 2007a, 54–55, *rt* could be a type of yellow wool (with reference to Akk. *urṭû*, AHw 1434, 4: 'Ginstterfarbstoff, gelb-bläuliche Wolle').
- 106 van Soldt 1990, 345; Singer 2008, 24.
- 107 According to the collation of RS 18.028 (4.341) made by Pardee 2007, 61, the correct reading of the beginning of line 4 is: *l. qn i m* "à l'intention des spécialistes de la pourpre"; comment to *qnum* in *ibid.* 66. Also *qnuu* "craftsman specializing in lapis lazuli ('dyer' or 'engraver'(?))" (DUL 705). See also mention of *šāripūtu* 'purple-dyers' in letter of Hittite provenance RS 20.03 (Lackenbacher 2002, 95 n. 276; Singer 2008, 22; Vidal 2005, 101–102).
- 108 van Soldt 1990, 321–325, 350–352 (who suggests the vocalization *aban šurrapī*), DUL 9, 790–791. See also letters from Emar RS 34.134:14 (RSO VII no. 31), RS 34.141:22 (RSO VII no. 32), RS 34.173:14' (RSO VII no. 33), as well as Hittite letter RS 34.133:41 (RSO VII no., 36).
- 109 van Soldt 1990, 349–350. For alph. *tl̥t* 'copper' see also Bordreuil, Pardee and Hawley 2012, 45–46.
- 110 Matoian and Vita 2009, 486.
- 111 DUL 321: 'sea snail (Shell), murex'. Also according to Dietrich 2010, 44, "From the point of view of preparing the purple dye, *ḡp* could then be the Ugaritic Word for a small snail, which was crushed to extract the secretion for dye".
- 112 According to Schaeffer, they were "dépôts enfouis dans la terre souvent atteignant un quart de mètre cube ou davantage de coquilles écrasées du murex", linked, in one case to a "fragment d'une grande marmite teintée de pourpre près de l'un de ces tas de murex écrasés, non loin d'un foyer" (Schaeffer 1951, p. 188 and 189, Fig. 1). G. Saadé and S. Marchegay mention this pot of Minet el-Beida, discovered near the tomb II (Saadé 1995, 217; Marchegay 2001, 16).
- 113 Though not with certainty, vestiges found by C. Schaeffer are likely to be linked to the use of *murex* for dyeing and to be in (or near) workshops.
- 114 Bounni and Lagarce 1998, 19–20.
- 115 Floor 190 of *locus* 106: Mallet and Matoian 2001, 95. J. Mallet's excavation in collaboration with V. Matoian.
- 116 The excavation of the 'Rempart' zone, directed by K. Al-Bahloul, has brought to light a recent Late Bronze house where the floors of several areas (courtyards I and II and *locus* VIII) are made of shells or fragments of shells. On this sector of the excavation, see K. Bahloul in Al-Maqdissi *et al.* 2007 and 2010, Matoian *et al.* 2013.
- 117 Also existing, in the house of the area 'Centre de la Ville', *Buccinulum corneum*, *Cymatium parthenopeum*, *Nassarius? cuvieri*, *Planaxis lineatus*.
- 118 Manual collection and sifting carry out by B. Lagarce, C. Boulland and V. Lecomte. A 125 g sample was taken to France for analysis.
- 119 Identifications conducted in May 2011 by Abel Prieur, in charge of the Centre Commun des Collections de Géologie, Université Claude Bernard Lyon 1, to whom we are indebted. Analyses have revealed the widespread use of *Murex (Hexaplex) trunculus* (along with, for the house in the 'Centre de la Ville', presence of: *Buccinulum corneum*, *Cymatium parthenopeum*, *Nassarius? cuvieri*, *Planaxis lineatus*). Regarding purple dye obtained from molluscs see, amongst others, Cardon 2007, ch. 11.
- 120 These two rooms are adjacent to areas of religious connotations.
- 121 Yon and Callot 1997, pp. 25–26.
- 122 DUL 541.
- 123 RS 18.024 (4.337):9, Ribichini and Xella 1985, 16: "filato di lana, o piuttosto un 'filo di ordito'"; DUL 800: "spun(?) wool"; Pardee 2000, 42 and 50 con n. 117: 'tissu de laine', 'laine tissée'.
- 124 At least in RS 18.024:9–10 (4.337): *kkrm . šrt. štt bd. gg[...] / b . 'šrt . ksp* "two talents of woven wool at the expense of Gg[...] for ten silver (shekels)".
- 125 RS 20.038 (Amiet 1992, n° 13).
- 126 Only stone material from the 'Centre de la Ville' has been the subject of specific analysis (Elliot 1991).
- 127 Elliot 1991.
- 128 Bounni *et al.* 2008, 75, cat. 099.
- 129 In terracotta (unpublished).
- 130 Courtois 1984, 65–69; Smith 1994; Karageorghis 2011, 23–26, 85–97.
- 131 Matoian and Vita 2009, 481. On RS 96.2006 see also Matoian 2008, 154, fig. 33. As of today, this

loom-weight with a sign is the only one we were able to weigh. It weighs 258.3 g.

132 Smith 1994.

133 Courtois 1984, pl. XXIII:3 ; Olivier 2007.

134 This custom is attested in the southern Levant during the Middle Bronze Age (Marcus and Artzy 1995; Peyronel 2004, 200–212), and in the Eastern Mediterranean during the Late Bronze Age (for Cyprus see Smith 1994, 215–216; for Crete see Militello 2007).

135 See recently in this respect Vita 2010. However, the exact identification of all the terms regarding cloth and garments in texts from Ugarit poses some difficulties, as explained in Matoian and Vita 2010, 471–472.

136 DUL 800. According to Ribichini and Xella 1985, 16, in RS 15.045:3 (4.152) the reading *udt* should perhaps be amended to *pdt*, in which case the line would mention a woollen *ipd* (DUL 89: “Type of garment (usually: ‘tunic’)”; Vita 2010, 328). Also Watson 2007, 330, proposes *mizrt* (DUL 519: “Garment, ritual tunic”; Vita 2010, 329) could be seen as a ‘woollen undergarment’.

137 DLU 670; Ribichini and Xella 1985, 58–59; Vita 2010, 331. RS 15.045 (4.152):7, RS 16.004 (4.205):7, RS 17.111 (4.270):8.12.

138 RS 15.035 (4.146):7.

139 DUL 400; Ribichini and Xella 1985, 39; van Soldt 1990, 328 nn. 50 and 55; Vita 2010, 329.

140 RS 15.045 (4.152):10.

141 DUL 400; Ribichini and Xella 1985, 39; van Soldt 1990, 332; Vita 2010, 330.

142 Matoian and Vita 2010, 494: “On pense ... à un décor brodé sans pour autant éliminer l’hypothèse d’un galon surajouté”.

143 Matoian and Vita 2010.

144 Here, we shall refer to one (RS 9.277, Louvre AO 19397) of the two bronze figurines, dated to the Middle Bronze Age, found in the so-called ‘Hurrian’ shrine (Courtois 1979, col. 1213. See also, more recently, Cluzan in Aruz *et al.* 2008, 47, no. 21). The personnage is wearing a long robe decorated with a lozange pattern and the fabric appears to be composed of tufts of wool. Nevertheless, this robe is unparalleled and, as for the Mesopotamian *kaunakes* of the third millennium BC, it is not really possible to identify the material.

145 Matoian and Vita 2010, 476.

146 Monchambert 2013.

147 “Nous y trouvâmes aussi des restes de divers meubles plaqués de feuilles d’or, de gros lingots de plomb argentifères, des vases en albâtre, des paquets à moitié calcinés de fourrures retenus par des fils de plomb. Parmi les décombres noircis par le feu nous retrouvâmes aussi plusieurs séries de poids” (Schaeffer 1954). See also Matoian 2008, 34.

148 Matoian and Vita 2010, 476. Carole Cheval could not conduct an identification based on available photographs.

149 Schaeffer 1932, 22, also mentions the find of a ‘treasure’ consisting of 2 kg of silver and gold objects “enveloppé dans un morceau de toile partiellement conservé grâce à l’oxydation”.

150 The excavator reports the find, in the zone ‘Ville Sud’, of three copper and silver ingots (RS 24.147), with “des traces de la trame du tissu adhérent aux parois”.

151 Bounni and Lagarce 1998, 69, and fig. 137. Though not certain, it is most probably linen cloth, rather than woollen cloth.

152 It is grave 642 of Marchegay (1999).

153 Courtois, 1979, col. 1268.

154 The matter of *intra muros* workshops in Ugarit has often been contemplated (see, amongst others, Margueron 1979 [regarding the palace], Gachet-Bizollon 2007 [regarding ivory and bone], Matoian 2000 [for vitreous materials], Dardaillon 2006 [with reference to metallurgy], Matoian 2008 [concerning the palace]). While recent investigations so far have noted the absence of a specific quarter devoted to industrial craftsmanship within the conglomerates located at the tell of Ras Shamra (Callot 1994; Yon and Callot 1997, 25–26; *against* the hypotheses of the excavators who claim that various ‘artisans quarters’ may have existed in some sectors of the city), the presence of numerous spindle-whorls in the area ‘Centre de la Ville’, as well as many needles in the southern part of the area ‘Tranchée Sud-acropole’, invites us to keep studying the entire ancient documentation from the viewpoint of the socio-cultural analysis of the old city.

155 See, for prehistoric textiles, the recently published dossier in the journal *Paléorient* (Breniquet *et al.* 2012).

156 “The more remarkable aspect of the Sidon linen textile is the use of splicing which, while attested at Jericho, is generally associated with Egyptian textile technology. At present it remains a matter of speculation whether the textile remains in burial 102 at Sidon represent an import from Egypt, textile made locally by Egyptian craftspeople, or textile made by Sidonians using techniques associated with

Egypt" (Gleba and Griffiths 2011–2012, 294).

157 James, Reifarth and Evershed 2011; Reifarth and Drewello 2011a; Reifarth and Drewello 2011b. See also the find, in the Middle Bronze age necropolis of Qatna, of a mineralized thread on a metal needle (Morandi Bonacossi 2011, 23, fig. 23).

158 Barber 1991, 228–229; Stieglitz 1994; Burke 1999; Becker 2001. See the contribution by P. Militello in this book.

159 In western Syria and Palestine the first archaeological testimonies date to the second half of the second millennium (Qatna, Minet el-Beida, Sarepta, Acco for the Late Bronze Age).

160 See, for example, Astour 1973; Caubet and Matoïan 1995; Buchholz 1999; Durand 1999; Merrillees 2003.

161 See, for example, Peyronel 2006.

162 In the final publication of House C, J. Gachet only points out one stone spindle-whorl, from *locus* 1048. We do not take into account here the spindle-whorl of *locus* 1273 pointed out by C. Elliott, because according to J. Gachet this *locus* does not belong in House C.

163 This corpus of five spindle-whorls from the 'Temple aux rhytons' is created following the publication made by J. Mallet (1987). In his inventory, C. Elliot takes into account several *loci* outside the 'Temple aux rhytons' (*loci* 59, 79, 80, 81). J. Mallet attributes spindle-whorl RS 80.5060 to *locus* 52 (and not to *locus* 77 as stated by C. Elliot).

164 These are streets 35, 1038, 1208, 1228.

165 Regarding the study of copper and bronze in Ugarit, see Chanut 2000, 244–263; for Ras Shamra/Ugarit weights made of copper alloy see Bordreuil 2006, 211–212; for metallurgic analyses, see Dardaillon 2008, 159–168.

166 On the study of lead in Ugarit, see Chanut 2000, 271–276; regarding lead weights in Ras Shamra/Ugarit, see Bordreuil 2006, 211–212; concerning the use of lead in Ugarit, see Dardaillon 2012, 222–225.

167 Concerning zoomorphic bronze weights from the Late Bronze Age originating in: Ras Shamra/Ugarit (Syria), see Chavane 1987, 367–372, Bordreuil 2004, 50, 51, 139, Bordreuil 2008, 232; Tell Açana/Alalah (Syria), see Arnaud 1967, 152, 154; Akko (Palestine), see Eran, Edelstein 1977, 62; Egypt, see Cour-Marty 1990, 23, 27, 42 fig. 14; Kalavassos (Cyprus), see Courtois, J.-C. 1983, 119–120; Uluburun and Cap Gelidonya shipwrecks (Anatolia), see Pulak 1996, 138–149.

168 Joukowsky 1985, 11–12; Herda 1996, 67–82.

169 Rahmstorf 2006, 19.

170 Bordreuil 2004, 51.

171 Vila 2008b, 170–172. See also in this paper pp. 311–312.

172 See also in this paper pp. 314–316.

173 Parise 1970–1971, 3–36; Courtois 1990, 119–127; Bordreuil 2006, 203–232.

174 Rahmstorf 2006, 21–22.

175 Archi 1987, 53, fig. 1, 17; Ascalone and Peyronel 2006a, 50–52, 54–55, 60–61.

176 Ascalone and Peyronel 2006b, 128, 130, 133, 135–136, 139, 145–151.

177 Arnaud 1967, 153–154; Ascalone and Peyronel 2006b, 136–137, 151, tab. 7.

178 Ascalone 2006, 163, 167, 173.

179 Oates, Oates and McDonald 2001, 586, fig. 485, 33–36.

180 Arnaud 1967, 153–154; Ascalone and Peyronel 2006b, 128, 133, 135–137, 145–151.

181 Ascalone 2006, 167, 173.

182 Ascalone and Peyronel 2006a, 55, 60–61.

183 Ascalone and Peyronel 2006b, 128–130, 133, 135–136, 139, 145–151.

184 Czichon and Werner 1998, 97–98, pl. 92, 869–870.

185 Arnaud 1967, 153–154; Ascalone and Peyronel 2006b, 136–137, 151, tab. 7.

186 Ascalone 2006, 163–164, 173.

187 Archi 1987, 53, fig. 1, 17; Ascalone and Peyronel 2006a, 55, 60–61.

188 Ascalone and Peyronel 2006b, 128, 136, 139, 145–151.

189 Ascalone 2006, 165, 173.

190 For this weight RS 8.172, with a value of one Karkemish shekel of 7.88 g.

191 For this weight RS 8.172, with a value of one Ugarit shekel equalling 9.46 g.

192 For this weight RS 8.172, with a value of one Hittite shekel of 11.83 g.

193 Cour-Marty 1990, 23.

194 Bordreuil 2006, 209–210.

18. Sheep Rearing, Wool Production and Management in Mycenaean Written Documents

*Françoise Rougemont*¹

Linear B written documents include both archival (tablets, nodules, labels²) and non-archival documents (mainly inscriptions on vases³ but also on various objects⁴). The economy of wool documented in the Mycenaean archives is exclusively the *palatial* economy of wool, as the private aspects of these activities eludes us completely. Tablets were only produced by scribes who recorded the economic activities of interest to the palace administration. The recent find of a tablet at the secondary site of Iklaina (Messenia) in the Pylos kingdoms⁵ might lead us to change this view; however, there is no indication that the new tablet differs in any way from previously known palatial texts.⁶ To date, Linear B archival documents have been unearthed at ten different sites on Crete and on the Greek mainland.⁷ The economy of wool is known only at a few stages, namely the production of wool and, to some extent, its processing and transformation into textiles. There is virtually no documentation related to wool or textile trade (see *infra* § 5).

Sheep rearing, wool and textile production are among the best documented economic sectors in the Linear B texts, as well as one of the most important in the economy of Mycenaean kingdoms. In the fifth edition of the Knossos tablets,⁸ 984 documents record flocks of sheep and 84 record allocations of wool,⁹ to which must be added 221 textile records;¹⁰ all these texts represent more than 35% of the overall Knossos corpus.¹¹ At Pylos the numbers are smaller: 29 documents are related to sheep rearing¹² and 13 to textiles,¹³ the total amounting to c. 4% of the corpus; but Pylos sheep tablets usually record many flocks, unlike the Knossos records which record only one. Mycenae texts include 29 wool tablets,¹⁴ 1 textile record and now 3 tablets recording animals from the Petsas House, i.e. c. 43% of the preserved documents are related to sheep rearing, wool production and textile manufacture. Thebes records include 17 sheep nodules, 16 Of (wool) tablets, 3 Oh (wool) tablets, 1 textile tablet, or c. 10% of the total documentation preserved.

Thus, the documents relevant to the economy of wool are unequally distributed amongst the different archives. There are also, of course, texts dated to different time periods,¹⁵ even though they are all from a time-span ranging from c. 1450–1400 to c. 1200 BC. Texts of interest to wool economy come from the sites of Knossos on Crete, Pylos in Messenia, Thebes in Boeotia,¹⁶ Mycenae in the Argolid,¹⁷ and Hagios Vassilios in Laconia.¹⁸ All types of records, as well as of

organisations and production structures, are not attested in each corpus of texts. This does not mean that they did not exist at a given site, but invites us to be cautious when attempting general reconstructions.

1. Mycenaean palaces reared sheep flocks mainly for wool production

There are huge discrepancies in the numbers of sheep attested at different sites. To quote only one example, a number equal to the total number of sheep recorded at Pylos (c. 10,000 animals), appears on a single Knossos tablet, Ce 162, from the *Room of the Chariot Tablets*, which is the most ancient deposit of Linear B tablets in the palace.¹⁹ However, factors like the number of texts preserved at a given site, as well as the relative size of the territories controlled, and the season when the palaces were destroyed and their archives burnt should always be kept in mind when trying to evaluate the relative importance of the wool economy at different sites. For example, the striking fact that the Pylos records include about ten times fewer sheep than those from Knossos, but also virtually no wool records and very little information about textiles is probably due also to the fact that the Pylos palace was destroyed at the beginning of the spring,²⁰ whereas Knossos was burnt later in the year, probably at the end of the summer.²¹

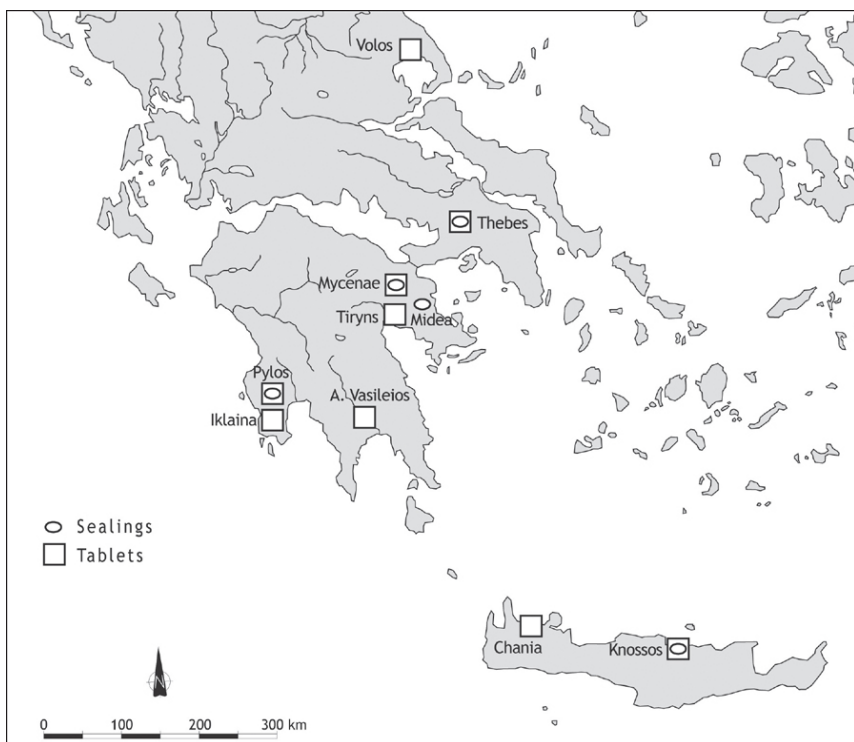


Fig. 18.1. Map of the Aegean world with distribution of Linear B archival documents (P. Darcque).

Knossos is usually the main case study used for sheep wool production, with over 900 flock records preserved. In the fifth edition of the Knossos tablets, there are 984 sheep records of the palm leaf type, each of them related to one single flock. However, for some flocks there is more than one record (the scribes wrote a record with the census of the animals as well as a 'shearing' record), so that the number of records is not equal to the number of flocks.

As demonstrated by J. T. Killen, the majority of the flocks were made up exclusively of castrated wethers, a composition typical for specialised wool production.²² According to the extant records, the palace at Knossos controlled c. 100,000 sheep.²³ This should of course be compared with the size of the island of Crete,²⁴ whose area is of more than 8,000 km². The Pylos archives only include 29 multi-entry flock records,²⁵ and a total of c. 10,000 sheep, but Messenia is a region with an area of 2,500 km², less than a third of that of Crete. It should also be noted that Pylos sheep records are mostly page-shaped, with multiple entries, each entry listing the information regarding one single flock,²⁶ thus one record usually lists many flocks.

In the archives of other Mycenaean sites, however, no systematic flock records are currently preserved, possibly because these are chance findings (and possibly because of the time of the destruction), but the interest of these palaces in the wool economy is otherwise attested by textile and/or wool tablets. For example, at Thebes, in the preserved records unearthed to date, only 17 sheep are registered on sealed lumps of clay called nodules.²⁷ These animals were recorded and gathered for the preparation of a sacrificial banquet, thus, as far as wool production is concerned, they were at the end of their productive cycle.²⁸ At the same site, however, wool records corresponding at least to the production of c. 200 sheep were found,²⁹ and some transactions attest to the shipment of wool as far as the island of Euboea. But only one record is related to textiles.³⁰ The surface of Boeotia is approximately of 2,500 km².

At Mycenae, sheep and animal records were found only recently in the Petsas House, which is located outside the acropolis.³¹ If we refer to the drawings in Iakovidis *et al.* 2012, X/Cp 3 bears only faint traces of an OVIS^m logogram on line 2, followed by traces of the numeral 20. Cp 7 records 24 ewes on line 3 but the record is badly damaged. Cp 9 is so badly preserved that the reading of the OVIS logograms seems rather uncertain. If it was better preserved and the reading of the logograms could be ascertained, this fragment would certainly be the best candidate for a flock record, since at least one hundred is recorded on both lines 1 and 2. Even though fragmentary and badly preserved, these documents give the hope that more information about sheep rearing might be expected in the future.³² The record Ui/X 2 has been interpreted as potentially including wool³³ but its state of preservation is insufficient to ascertain the identification of the commodity recorded, so it should be left aside.

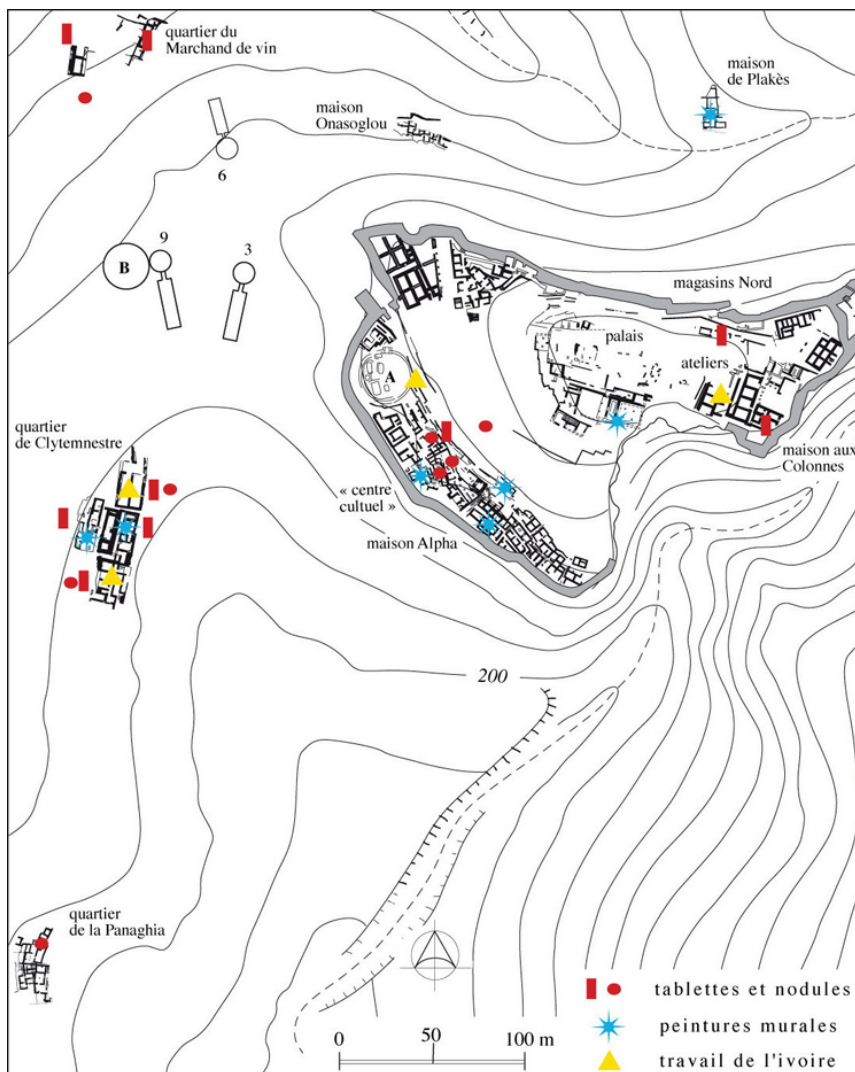


Fig. 18.2. Map of Mycenae with findspots of Linear B tablets and nodules, wallpaintings and ivory work (P. Darcque).

On the other hand, the amount of wool recorded on the Oe tablets at Mycenae³⁴ imply control of at least 1,768 sheep. However, it should be kept in mind that Oe records (from the House of the Oil Merchant) are dated to the LH III B1 period, whereas the sheep tablets from Petsas House are from the LH III A2 destruction deposit, thus earlier than the wool records.⁴⁵

Site	Number of documents related to sheep, wool, textiles	Total number of texts at the site	% of total extant documentation
Knossos (Crete)	984 sheep tablets 84 wool tablets 221 textile tablets (some of them from the RCT) ³⁵	c. 3550 documents outside the RCT + 650 RCT texts	c. 35%
Pylos (Messenia)	29 sheep (and goat) tablets, but most of them are page shaped documents 13 textile tablets	1133 documents ³⁶	c. 4%, but most of the sheep tablets are multi-entries documents
Thebes (Boiotia)	17 sheep nodules (Liagkas plot) ³⁷ 16 Of (wool) tablets 3 Oh (wool) tablets 1 textile tablet	363 documents ³⁸	c. 10%
Mycenae (Argolid)	29 Oe (wool) tablet (House of the Oil Merchant) ³⁹ 1 textile tablet ⁴⁰ 3 animal records including sheep (?) from the Petsas House ⁴¹	65 documents ⁴² + 13 fragments from the Petsas House ⁴³	c. 42%
Hagios Vassileios (Laconia)	1 textile tablet (Lg 3)	5 documents ⁴⁴	20%

Table 18.1. Numerical importance of sheep/wool/textile documentation: some elements of comparison.

When comparing the figures, it is particularly important to keep in mind that the surrounding plain of the Argolid has a surface area of only 230 km². Moreover, the same region includes two palatial sites with archives (independently of the question of their respective status).⁴⁶ Since the archives preserved at both Mycenae and Tiryns are probably only a part of what was originally written and kept at both sites, this means that many more sheep might have been registered than what are preserved in the documents unearthed to date. Lastly, one textile record, Lg 3, was recently found at Hagios Vassileios in Laconia.⁴⁷ The overview of both the extant written evidence and the numerical data related to different aspects of the wool economy at all Mycenaean sites is tabulated in Table 18.1.

2. Wool flocks and wool production

Thus the information available on Mycenaean wool flocks and wool production comes mainly from Knossos. At this site, the majority of the ‘sheep tablets’ are palm leaf records⁴⁸ each registering a single flock. However, the palm leaf format does not always correspond to a single flock or a limited number of animals.⁴⁹

As on all Mycenaean tablets, sheep are registered by means of a logogram, *106 (𐀓), conventionally transcribed by the Latin name of the animal, OVIS. As can be seen on Knossos tablet Db 1097, the sex of the animals is indicated by two horizontal lines crossing the vertical ascender of the logogram for males (OVIS^m 𐀓), and two slightly divergent vertical lines for the females (OVIS^f 𐀓) (Fig. 18.3).

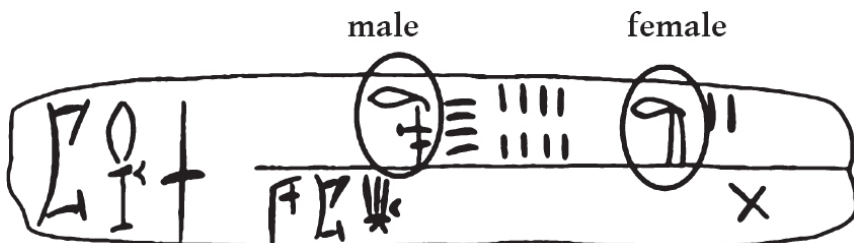


Fig. 18.3. KN Db 1097: male and female sheep logogram (drawing L. Godart).

KN Db 1097

(117, J1)⁵⁰

.A

OVIS^m 48

OVIS^f 2

.B ta-za-ro / u-ta-no

X

The same applies also for other domestic species, for ex. goats (CAP^m ; CAP^f ) or pigs (SUS^m ; SUS^f ). The composition of flocks made up exclusively from, or from a majority of male animals is typical for specialised wool production.⁵¹ Male sheep were castrated for a better wool production. Castration itself is not explicitly noted by the scribes, neither for sheep, nor for bovids⁵² or pigs.⁵³ The flocks of sheep are usually made up of a round number of animals, hundred, a multiple or a sub-multiple of ten. The scribes, in most cases, only write down brief notes: what is understood as the shepherd's name,⁵⁴ the place name, the sheep logograms, and the figures. In some cases, another personal name, often written in the genitive case, is added; those people are conventionally called 'collectors' in the publications, and their exact function in the economy of wool and textiles remains a debated issue.⁵⁵

The sheep logogram is often specified by an adjunct or syllabic sign written just before the logogram.⁵⁶ Some of these are related to the age of the animals, which is important for both the quantity and quality of wool production. As shown by Killen, the main age categories are lambs (*ki* OVIS^m), 'new' lambs (*ki ne* OVIS^m where *ne* stands for *ne-wo*), sheep 'from this year' (*za* OVIS^m, where *za* stands for *za-we-te*, alph. Greek *σάφετες; cf. substantive ἔτος, 'year'), sheep 'from last year' (*pe* OVIS^m, where *pe* stands for *pe-ru-si-nu-wo* περυσινῶϊ; cf. class. Greek περυσινός), adult sheep (OVIS^m) old sheep (*pa* OVIS^m, where *pa* stands for *pa-ra-jo* class. Greek παλαιός, 'old'). The scribes also used syllabograms used logographically, for example *WE*, for */wetalon/*, 'yearling'.

On Pylos Cn 40, some groups of sheep are recorded according to their age, indicated by complete words: on lines 1, 5, and 8 the adjective *pa-ra-jo*, 'old', which gives the key to the interpretation of *pa* OVIS^m, and on line 2 the adjective *wo-ne-we*, designating the animals as 'lambs', young animals (alph. Greek *φορνῆφες 'young'; cf. the substantive ἀρήν, 'lamb').

PY Cn 40

(S4-H21, AC)⁵⁷

- | | |
|---|-----------------------|
| .1 wa-na-jo, wo-wo, pa-ro, ne-ti-ja-no-re, pa-ra-jo | OVIS ^m 140 |
| .2 wa-na-jo, wo-wo, pa-ro, po-so-po-re-i, wo-ne-we | OVIS ^m 75 |
| .3 wa-na-jo, wo-wo, pa-ro, zo-wi-jo, a-ko-so-ta-o | OVIS ^m 70 |
| .4 wa-na-jo, wo-wo, <u>pa-ro</u> , po-ru-qo-ta, we-da-ne-wo | OVIS ^m 60 |
| .5 e-ko-me-no, pa-ro, pa-ta, pa-ra-jo | OVIS ^m 80 |
| .6 e-ko-me-no, pa-ro, []ma-te-we, we-da-ne-wo | OVIS ^m 70 |
| .7 a-ne-u-te, pa-ro, ma-ri-ti-wi-jo, a-ko-so-ta-o | OVIS ^m 83 |
| .8 ma-ro-pi, pa-ro, ro-ko, pa-ra-jo | OVIS ^m 150 |
| .9 ma-ro-pi, pa-ro, ka-da-ro, we-da-ne-wo | OVIS ^m 85 |
| .10 ma-ro, pa-ro, tu-ri-ta, a-ke- <u>o</u> -jo | OVIS ^m 80 |
| .11 re-pe-u-ri-jo, pa-ro, e-zo-wo, a[-ko-so-]ta- <u>o</u> | OVIS ^m 82 |
| .12 ma-ro, pa-ro, ma-u-ti-jo, a-ko- <u>so</u> -ta-o | OVIS ^f 60 |
| .13 a-ne-u-te pa-ro, ka-ta-wa, a-ko-so-ta | OVIS ^f 80 |
| .14 a-te-re-wi-ja, pa-ro, e-wi-te-we, a-ke-o-jo | OVIS ^f 70 |
| .15-16 | vacant |

However, wool flocks sometimes also include types of sheep other than wethers.

For example, KN Df 1121 records 143 wethers, 36 ewes, and 21 ‘last year’s’ animals, that is a total of 200 sheep (Fig. 18.4).

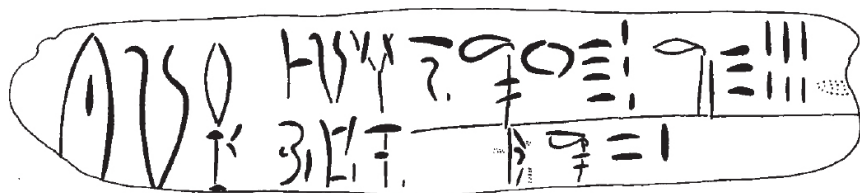


Fig. 18.4. Tablet KN Df 1121 (drawing L. Godart).

KN Df 1121

(117, J1)

.A da-mi-ni-jo OVIS^m 143

OVIS^f 36

.B ti-mi-za / ku-ta-to, pe OVIS^m 21

Sheep records not only include tablets recording the census of the flocks, but also tablets improperly called ‘shearing records’,⁵⁸ where the flocks are registered along with wool entries.⁵⁹ As shown by the following so-called ‘shearing record’, which can be matched with Df 1121 by the fact that it bears the same shepherd’s and ‘collector’s’ names, the other types of adult sheep are normally treated by the administration just as wethers when it comes to wool production: Dk(2) 1076 records only the total number of animals, without going into the detailed flock composition which appears in the census record Df 1121; the place name is even omitted in the ‘shearing record’.⁶⁰ The *o* rubric, where *o* stands for *o-pe-ro*, (cf. alph. Greek ὄφελοϛ)⁶¹ or maybe a non-attested form **o-pe-ro-me-no*,⁶² on line .B acknowledges the fact that part of the wool had not yet been delivered to the palatial administration and was thus still due (Fig. 18.5).⁶³

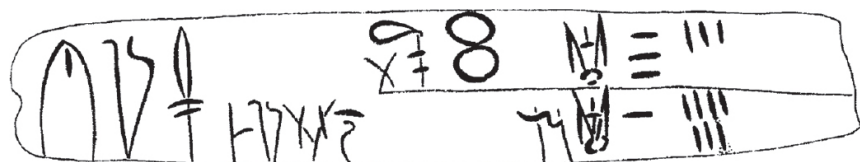


Fig. 18.5. Tablet KN Dk(2) 1076 (drawing L. Godart).

KN Dk(2) 1076

(119, J1)

.A X OVIS^m 200 LANA 33

.B ti-mi-za / da-mi-ni-jo o LANA 17

It is generally assumed that old sheep, last year’s animals, yearlings or ewes were drafted into wool flocks when the required number of wethers was not available for some reason. The same amount of wool was nonetheless expected by the administration, whatever the age and sex of the adult animals.

For wethers-only flocks or for the mixed flocks which are regarded by the palace scribes as equivalent, the records of wool production show a recurrent pattern in the relationship between the number of animals and the quantity of wool produced. This allows the reconstruction of palatial targets: 4 wethers or

replacement animals were expected to produce 1 unit of wool or 3 kg, that is a quantity of c. 750 g per animal.⁶⁴ The logogram LANA is used both as a designation of the commodity and as a unit of weight, just as is the case also for other logograms (the oil logogram OLE and the wine logogram VIN, e.g., are used also as capacity measures).⁶⁵

KN Dk(2) 1065 (119, J1)

.A X OVIS^m 100 LANA 11 M 1 [
 .B ka-da-no / ku-ta-to o LANA 13 M 2 [
]

On KN Dk(2) 1065, if we sum up the wool delivered (on line .A) and the wool still to be delivered (rubric *o* on line .B), the total is of LANA 25 for a flock of 100 wethers, which implies that 4 animals were expected to produce 1 unit of wool (3 kg), or c. 750 g of wool per animal.

In rare instances, the quantity of wool is slightly higher than this ratio, as on KN Dk(1) 931, with a quantity of c. 840 g per animal.

KN Dk(1) 931 + 7293 (120, I3)

.a] ko-ma-we-to
 .b]da / sa-jo, OVIS^m 100 LANA 28
]

On the other hand, breeding flocks, which include ewes and lambs, also produce wool and show a different ratio between the number of animals and the wool to be produced. In this case, the scribe recorded, on the same tablet, the number of ewes and figures related to both lambing and wool production.

KN D1(1) 933 + 968 + 975 (118, I3)
 .A] po-ti-ni-ja-we-jo OVIS^f 40 LANA 3 o LANA 9
 .B]-*83-re-to, / si-ja-du-we o OVIS^f 20 o *ki* OVIS^m 60
]

There is no way to ascertain if lambs (*ki* OVIS^m) were supposed to produce wool too. Here, we thus have either 120 sheep (40 ewes present + 20 ewes missing + 60 missing lambs) expected to produce 12 units of wool (3 delivered, 9 missing), that is 10 sheep for 1 unit of wool, or 300g per animal; or, if we think that lambs produced little or no wool at all, 60 ewes for 12 units of wool, or 5 sheep for 1 unit of wool, that is 600 g per animal, which comes closer to the usual target for wethers-only flocks.

3. Potential other sources of information: iconography and archaeozoology

Other sources of information which can be compared with the elliptic Mycenaean written records are of course iconography and archaeozoology,⁶⁶ but these are not always as helpful as one would wish. Sheep are more rarely represented in the iconography than other animals.⁶⁷ Among the few depictions available, there is a well-known clay vessel from the site of Palaikastro in Crete, with applied figurines of a shepherd and his flock. However, not only is the precise identification of the animals difficult (as they might well be other animals than sheep), but the object is much older than the Linear B tablets, since it is dated to the MM IB–IIA period.⁶⁸ A wall painting on the North wall of the West House at Akrotiri on Thera island

shows two shepherds leading a flock of sheep and goats⁶⁹ but this is also much earlier than the Mycenaean period.⁷⁰ Sheep are depicted on the upper part of the painting, walking towards the right, while goats, represented on the lower part of the picture, walking towards the left. The animals are represented in pairs where each individual contrasts with the other in colour. This makes the identification of particular sheep species difficult, since colours and markings are apparently used as a means to express individuality more than as a way to render particular physical characteristics of a specific animal. Beyond the fact that these are domesticated sheep,⁷¹ it was suggested by L. Morgan that they have features of both the adult male mouflon sheep (*Ovis musimon*) and the urial (*Ovis orientalis*), the reddish sheep with dark horns being more of the mouflon sheep type, and the ones with pale bodies and white horns, a black streak behind the shoulder and a conspicuous neck ruff looking more like the urial. Some animals are simply outlined, and their body left unpainted or painted white, but this is also the case for other species, like goats or antelopes, and might not need any particular interpretation. Lastly, sheep depicted as yellow and reddish might most likely simply be the rendering of two shades of the natural wool colour. L. Morgan summarizes briefly the information provided by the Linear B texts and suggests that the Thera wall paintings may reflect “a similar situation to that of the Knossos tablets, though on a smaller scale and not pertaining to a palace economy”.⁷²

Aegean seals offer pictures from a greater variety of animals, including sheep, though again represented less frequently than other species⁷³. Mycenaean zoomorphic figurines seem to represent mostly bovids.⁷⁴

Archaeozoological data are of course available for Greek Bronze Age sites;⁷⁵ for example, K. Trantalidou⁷⁶ records 45 prehistoric sites for which detailed reports on fauna are available. This number has increased considerably during the recent years, though not all sites are dated to the Mycenaean period; but when it comes to sheep, they either establish very basic facts – domesticated sheep are attested at Knossos since the Neolithic⁷⁷ – or acknowledge that “faunal analysts struggle to identify much of their material beyond the level ‘sheep/goat’”.⁷⁸ The age of death and its variations, though, provide useful indications about flock management.⁷⁹ Recent studies have focused mainly on sacrifice and butchering practices,⁸⁰ studying cutting marks, establishing the age of death, and offer in general no help for problems like potential wool yield. Moreover, palatial flock records come by definition from palatial centres, and osteological data are gathered mostly from settlements, whereas wool flocks were most probably distributed on the territory of the different palaces.

4. Wool in the Linear B tablets

4.1. Designations, types and qualities of wool

4.1.1. Designations for wool

Wool is designated by the logogram *145, which might go back to the Linear A script.⁸¹ However, the connection between MA+RU (the two components of the LANA logogram in Linear A) and the Greek word for wool, /mallos/ is often mentioned but should be rejected,⁸² since there is no way to be sure that the signs AB 80 and AB 26 had the same phonetic value in both scripts. There are no direct attestations of a Mycenaean word for wool, but on two Knossos tablets dated to the two main periods of the Linear B archives at this site,⁸³ textiles are described as

we-we-e-a, /werwe^{he}ha/ ‘woollen’, an adjective derived from a form /werwos/, which then was the word for wool (alph. Gr. εἶρος).⁸⁴

4.1.2. *Fleeces*

Wool is sometimes also recorded in the form of fleeces, which are designated by the Mycenaean word *po-ka*, alph. Greek ποκαί;⁸⁵ At Knossos, there is one mention of ‘new fleeces’ on KN Dp 997, which is interestingly followed by the OVIS^f logogram, and there is also a possible indication of “fleeces from last year”, on KN Dp 7742. Both of these are found in connection with the name of the goddess Potnia, whose economic interests include animal breeding (with both sheep and pigs)⁸⁶ as well as textile production (particularly well documented at Thebes).⁸⁷ In any case, ‘new fleeces’ are to be paralleled with mentions of ‘new’ wool in the Mycenaean tablets (MY Oe 111.3).⁸⁸

KN Dp 997 (118)

.a] po-ti-ni-ja-we-ja [

.b]to-sa, / ne-wa, po-ka OVIS^f[

“so many new fleeces belonging to Potnia⁸⁹ EWES[”.

4.1.3. *Wool tufts*

Wool is also attested in the form of wool tufts, designated by the Mycenaean word *ti-ra*, alph. Greek τίλαι, again at Knossos; these are delivered to the palace administration by an individual named *qo-ja-te*, on KN Od (1) 681.

KN Od (1) 681 (103, F18)

.a ‘e-na-po-na, o-nu, pa-i-ti-jo’ e-ti-wa-ja-qe LANA[

.b qo-ja-te a-pu-do-ke, **ti-ra** [

Line .b reads: “*qo-ja-te* (personal name) delivered (wool) tufts [”.

4.1.4. *Wool ‘roots’*

Some texts record the logogram LANA along with the word *wi-ri-za*, which corresponds to alph. Greek ρίζα, ‘root’. This is the case in two Knossos wool records,⁹⁰ as well as in one Pylos record of ingredients allocated to an unguent boiler.⁹¹ In the latter case it is generally assumed that the lanolin from the wool was used for perfume making.⁹² However, an interesting alternative interpretation is suggested by C. W. Shelmerdine,⁹³ who stresses that the word *wi-ri-za* is absent from PY Un 267, another document with a list of ingredients for perfume making, and argues that “finally the wool listed here was most probably used for straining the perfumed oil”). The case of the Od records remains more enigmatic. Finally, the word is probably also to be restored on the fragmentary tablet X 44.⁹⁴

.A] wi-ri-za

.B]vest. / su-ri-mo LANA 1

“ wi-ri-za, *ῥπίζα, ‘root’
 (at) su-ri-mo WOOL 3 kg”

PY Un 249

(Cii, AC)

.1a po-ti-ni-ja-we-jo
 pi-ra-jo , a-re-pa-zo[-o] ku-pa-ro₂ AROM 2 T 5

.2 wi-ri-za LANA 2 [] *157 10

.3 vacat [] KAPO T 6

.4-5 vacant

“To Philaios, unguent boiler of Potnia, nutgrass AROM 2 T5
 ‘root’ WOOL 2 units [] *157 10
 [] KAPO T 6”.

4.1.5. Qualities of wool

Indications on the wool qualities are scarce in Linear B texts, unlike the categories of ‘first, second, third quality wool’ attested in Near Eastern cuneiform records of different places and periods.⁹⁵ Only a handful of Mycenaean documents show that lamb’s wool was exploited: on two Knossos tablets young sheep ‘ki’ *ne* OVIS^m are associated with wool quantities.

KN Dk(2) 1066

(119, J1)

.A] ‘ki’ *ne* X OVIS^m 200 LANA 19

.B]te-u / ku-ta-to[] vac.

Here 200 ‘ki’ *ne* lambs are associated with 19 units of wool or 57 kg, meaning a production of 285 g per animal.

Here the total, if the figures are complete, would be of 20 kg for 100 young animals, or c. 200 g per animal. However, something might be lost in the lower part of the document, where the traces of an *o* as well as a LANA logogram are still visible. There are also some hints that more documents might have recorded wool expected from lambs, as on the fragmentary record Dh 7231 + 9346.⁹⁶

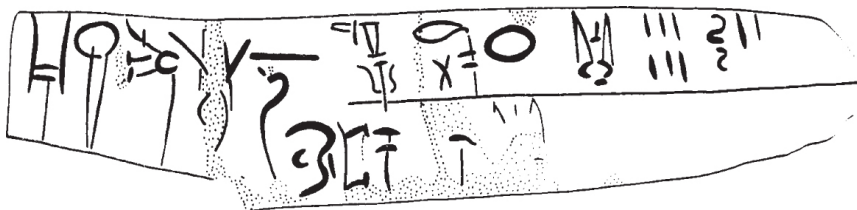


Fig. 18.6. Tablet Dk(2) 1067 (drawing L. Godart).

KN Dk(2) 1067 + 5189

(119, J1?)

.A 'ki' ne X OVIS^m 100 LANA 6 M 2

.B a-ko-mo-ni-jo / ku-ta-to [*vestigia*]

KN Dh 7231 + 9346

(120)

]i-so , ki OVIS^m 50 LANA[

Lastly, MY Oe 111 records on line 2 an unknown⁹⁷ quantity of lamb's wool (*wo-ro-ne-ja*, from **φρόνεγος*, cf. class. Greek *ἀρήν*, *ἀρνός*, 'lamb'), distinguished from *o-u-ka* LANA, **ὄφικά*, "sheep wool", qualified as *pe-ru-si-nwa*, 'from last year' on line 1 and *ne-wa*, 'new' on line 3) (Fig. 18.7).⁹⁸

4.1.6. *Origins of the wool?*

Some specifications added by scribes to the logogram LANA might refer to particular qualities or types of wool, such as *ku* LANA on the Thebes Of tablets.⁹⁹ However, the exact meaning of *ku* in the Of tablets remains uncertain. It has been hypothesized that it might be the abbreviation of the adjective *ku-pi-ri-jo/-ja* 'Cypriote',¹⁰⁰ in which case it should be paralleled with the reading suggested on KN Od 667 (cf. *infra*). However, this suggestion is not accepted by all scholars.¹⁰¹

MY Oe 111 + 136

NMA 52-111 + 136 (51)

.1 pe-ru-si-nwa , o-u-ka[

.2 wo-ro-ne-ja , pa-we-si / [•]-me-'jo-i' LANA[

.3 ne[-wa]o-u-ka LANA[

.4]-ki-ni-*56 LANA 100

.5] o-ta-pa-ro-te-wa-ro LANA 200[

.6] *vacat*

wa: /poliwa/ textiles of grey colour;¹¹¹ *po-ki-ro-nu-ka: /poikilonuka/* textiles with multicoloured *onuke* (fringes?).¹¹²

We also know from Pylos records An 35 and Un 443 that the palace at Ano Englianos acquired alum (Myc. *tu-ru-pte-ri-ja*, alph. Greek στρυπτηρία), a commodity used in the dying process, by means of exchange against she-goats and a variety of commodities, including wool, textiles and foodstuffs.¹¹³ The tablet records the ‘payment’ made to the individual providing the alum; however, there is no indication about the quantity of alum.

PY An 35

(H3, AC)

(Second rubric)

.5 a-ta-ro , tu-ru-pte-ri-ja , o-no

.6 LANA 2 CAP^f 4 *146 3 VIN 10 NI 4

“l. 5 For *Atalos* (personal name), price/equivalent of the alum

l. 6 WOOL 6 kg, 4 she-goats, 3 pieces of *146 (a textile item), WINE 280 l., FIGS 384 l.”

The word *tu-ru-pte-ri-ja* is also attested on a fragmentary Tiryns record, TI X 6:114

TI X 6

(—)

.a]37 [

.b]4 M 7 tu-ru-pte-ri-ja[

Whatever the exact commodity recorded on line .b before the alum, it was a weighed product, as shown by the use of the unit M.

4.3. Wool processing

The processing of wool and its preparation for use in textile manufacture is known mostly indirectly, though professional designations applied to workers like ‘combers’ (*pe-ki-ti-ra₂*, /*pektriai*/)¹¹⁵, ‘spinners’ (*a-ra-ka-te-ja*, /*ālakateiai*/)¹¹⁶; female¹¹⁷ and male weavers,¹¹⁸ *pe-re-ke-we*,¹¹⁹ which may designate a special type of weavers (?). Last but not least, the texts offer a variety of specialised professional designations derived from textile names.¹²⁰ At the end of the process, specialized craftsmen/women like finishers or decorators (*a-ke-ti-ri-ja* or the variants *a-ke-ti-ra₂* and *a-ze-ti-ri-ja*)¹²¹, and fullers (*ka-na-pe-we*)¹²² worked on the textiles.

Some words might offer additional insights into wool processing, like the adjective *ko-ro-to*, attested in the Knossos Od series¹²³ as well as at Mycenae on Oe 106; the interpretation of this word is disputed, and it might refer either to spun (/ *klōston*/)¹²⁴, or to dyed (/ *khōrōston*/) [thread, wool]¹²⁵. As a whole, these indications remain uncertain since they rest on very fragile hypotheses.

5. Wool in economic transactions: palatial allocations to workers or production structures

Economic transactions regarding wool include mainly allocations made to workers and/or production structures manufacturing textiles.¹²⁶ There are no documents related to anything like wool trade,¹²⁷ even though a Mycenae tablet might refer to the exchange of textile items between two Mycenaean kingdoms:

MY X 508

NMA 7700, (—)

.a] te-qa-de , ta [

]ze-ta , / pu-ka-ta-ri-ja_ ma-ri-ne[

]ze-ta is a personal name, *te-qa-de* indicates that the *pu-ka-ta-ri-ja* textiles are to (be sent to?) Thebes ; the incomplete word *ma-ri-ne* [could be the beginning of another personal name or of a possessive adjective derived from this personal name.

This document records *pu-ka-ta-ri-ja* textiles along with a place name in the allative form, *te-qa-de*, which is identical to the Mycenaean name of Thebes.¹²⁸ Thus, if this could be confirmed to be a reference to Boeotian Thebes, we might hypothetically have a record of textiles sent from Mycenae to another Mycenaean kingdom.

We do not know either about the value or price of the wool, but at least one Knossos text, L 693, might record the value of linen textiles in bronze.¹²⁹

Finally, the elliptic text on KN Wm 8493 might refer to a transaction of wool between two localities, *se-to-i-ja* (on side .a) and *ki-ri-ta-de* (toponym in the allative form, on side .b-α). The use of the verb *do-ke* 'he/she/it gave' reminds us of transactions between individuals,¹³⁰ for example on oil records. As the other Wm nodules, the object has a suspension hole but no seal imprint, thus it was not authenticated and its exact purpose remains unclear. There is no quantity indicated after the logogram LANA, and the exact meaning of the abbreviation *te* remains an open question.

5.1. Wool storage

In her study of the Knossos Od series, M.-L. Nosch has suggested that the administration might have centralised the information on the wool rather than the wool itself.¹³¹ Thus wool might not have been stored where the tablets were found. Another possibility is that wool was very quickly redistributed from palatial storerooms, as suggested for Mycenae by C. Varias Garcia.¹³² According to this author, the total quantity of wool recorded in the Oe tablets, 1,371 kg, exceeds the storage capacity of Room 2 of the House of the Oil Merchant,¹³³ where the tablets were found: the capacity of the room is of 37.5m³ or 1,236 kg of wool, based on the estimation of volume for the wool calculated by J. L. Melena.¹³⁴ However, it should be noted that the tablets found in the South-East corner from the Room 2 might have been originally stored at an upper level (from which they fell during the destruction of the building); this upper level is not preserved and its dimensions might have been bigger than the remains preserved at the actual ground level. Moreover, the tablets need not have been stored at the same place as the wool itself. Last but not least, more recent calculations tend to show that the wool quantities registered in the Oe tablets could have been stored in the rooms where the tablets were found (which of course does not mean that they were).¹³⁵

Some Linear B tablets record wool quantities located 'at someone's place', that is either a storage facility or, perhaps more plausibly, a workshop; for example, the tablet MY Oe 111.5 reads *o-ta-pa-ro-te-wa-ro*, 'being at *te-wa-ro*'s place', followed by 600 kg of wool.¹³⁶

5.2. Wool allocations and deliveries

Mycenaean palace scribes carefully recorded quantities of wool going out of their storerooms for a variety of reasons.¹³⁷ Allocations could be made to group of workers recorded by professional designations, or by ethnics derived from the name of their villages; but wool was also sent to different types of production structures recorded by the name of the person in charge of them, as well as to workgroups or workshops depending from sanctuaries.¹³⁸

On Crete, wool went to female workgroups operating in the framework of a palace monitored *corvée* system called *ta-ra-si-ja*, a term which has been compared with Mesopotamian *iškaru*.¹³⁹ In this organisation of production, workers or workgroups received a weight of wool and returned it in the form of finished textiles, according to targets set by the palatial administration.¹⁴⁰ It is attested in relation to a number of places in central Crete, and applied to the manufacture of particular types of textiles. This organisation of production has been the subject of numerous studies and will not be dealt with here in detail.

Allocations of wool are made by the palatial administration to female workers or workgroups,¹⁴¹ for example 3 kg of wool to a (female) ‘old spinner’ on the Thebes record Of 34, l. 2 (Fig. 18.8). But wool allocations also go to male workers,¹⁴³ either recorded by professional designations, for example, a delivery to a young fuller, on MY Oe 129, or to *pe-re-ke-we* (dat. sg or nom. pl., on MY Oe 130), or simply by their name, e.g. to a man named *pa-pa-ra-ki* on the island of Euboea on TH Of 25.2.

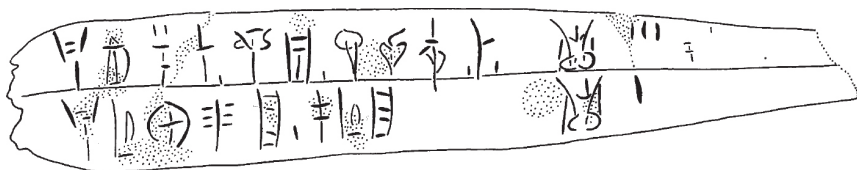


Fig. 18.8. Tablet TH Of 34 (drawing L. Godart).

TH Of 34 (303)

.1 a-pi-qo-ro , ne-wa , ko-tu-ro₂ , DA , LANA 3 [[PA 1]]¹⁴² [

.2 a-ra-ka-te-ja , pa-ra-ja LANA 1 [

l. 1 (to the) young servant, ko-tu-ro₂ (personal name),
the DA (= overseer) WOOL 9 kg

l. 2 (to the) old spinner WOOL 3 kg

MY Oe 129

.a di-du-mo

ne-wo, ka-na-pe-we LANA 4

“For Didymos, the new (young?) fuller, WOOL 12 kg”.

Palatial wool deliveries go to workshops, usually designated by a preposition *o-pi*, meaning ‘at somebody’s place’, with a personal name,¹⁴⁴ as on KN Od(1) 562 l.1, which records wool brought by one individual (*a-ti-pa-mo*) to the workshop of another individual (or by a preposition *pa-ro* + personal name).

KN Od(1) 562 (103)

.1]o-pi, no-nu-we , ‘a-ti-pa-mo’ pe-re LANA 91

.2]si-da-jo, pe-re ‘po-ro-to’ LANA 42

.3 a-po-te, pe-re LANA 69

“at *no-nu (PN), a-ti-pa-mo (PN) brings WOOL 273 kg

(at)]-si-da-jo, brings po-ro-to (?) WOOL 126 kg.

a-po-te (PN)¹⁴⁵ brings WOOL 207 kg.”

In addition, at Thebes allocations can be made to production structures called /do/ (δῶ), which is one of the Greek words for ‘house’.¹⁴⁶ They were most probably small-sized production units, perhaps organized at a domestic scale. At Thebes, small quantities are sent to two such structures: e.g. on Thebes tablet Of 26.2 (Fig. 18.9), 1 kg of wool is sent *ko-de-wa-o*, *do-de*, to the /do/ of an individual named **ko-de-wa*. On line 3 the same quantity is sent to the /do/ of an individual named *di-u-ja-wo*.

These /do/ structures are not registered with a place name, which suggests that they were located in the immediate vicinity of the centre.¹⁴⁷

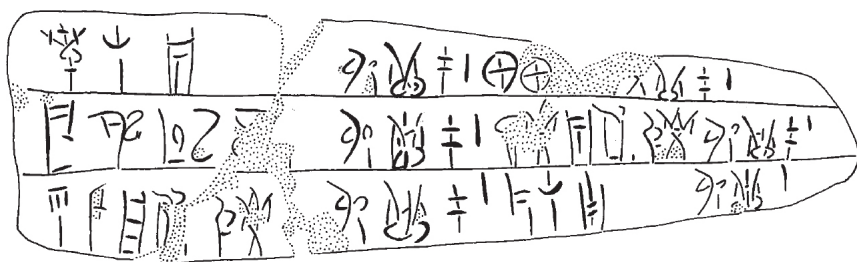


Fig. 18.9. tablet TH Of 26 (drawing L. Godart).

TH Of 26

(303)

- | | | | | |
|----|------------------------|--------------|---------------------------|--------------|
| .1 | pu ₂ -re-wa | ku LANA PA 1 | ka-ka[] | ku LANA PA 1 |
| .2 | su-me-ra-we-jo, | ku LANA PA 1 | <u>ko-de-wa-o</u> , do-de | ku LANA PA 1 |
| .3 | di-u-ja-wo , do-de | ku LANA PA 1 | po-re-si | ku LANA 1 |

Other structures receiving wool allocations at Thebes are designated by the word /wo-ko/, alph. greek οἶκος (also attested at Knossos, where the record, however, is not about wool). They are associated both with divinities (Potnia at Thebes) and human beings (an individual **ma-ri-ne-u* at Knossos).¹⁴⁸

TH Of 36

(303)

- | | | | |
|----|---|-----------|---------------------------------------|
| .1 | no-ri-wo-ki-de | ku LANA 1 | a-ke-ti-ra ₂ , wa-na-ka[] |
| .2 | po-ti-ni-ja , wo-ko-de, a-ke-ti-ra ₂ | ku LANA 1 | [] |

L2 “To the *oikos* of Potnia, (for) the finisher 3 kg of ku LANA”.

They are probably small to middle-sized structures: KN As(2) 1519 records ten men sent to such a structure, which gives an idea of the work force associated with these. At Thebes, small quantities of wool are delivered to such a structure dependent on the goddess Potnia. These were also most probably located near the administrative centre (for the same reasons as the /do/ structures).¹⁴⁹

Finally, wool or clothing rations have never been securely identified in Linear B records. Some tablets record small wool quantities given to people designated by a profession apparently unrelated to woolworking and textile manufacture, like bakers, bronze workers or potters.¹⁵⁰

MY Oe 121

(56)

- | | | | | |
|----|---------------|--------|-------------|------------------|
| .1 | i-ti-we-ri-di | LANA 5 | ku-ka | LANA 2 [] |
| .2 | ka-ke-wi | LANA 2 | pa-se-ri-jo | ko-wo LANA 2 [] |

“l. 2 (for) the bronze worker, 6kg of wool”

This might be something akin to rations,¹⁵¹ if the wool is not a kind of payment or remuneration, which cannot be ascertained given the elliptic nature of the document.

*

Palatial wool, sheep and textile records are best known at Knossos, but probably existed in significant numbers, even if on a somewhat more limited scale, at other sites. However, one should always proceed very carefully with any evaluation of the relative importance of the wool economy in different regions of the Mycenaean world, and of course keep in mind the relative areas of the territories concerned. Moreover, it is often said that Pylos tablets offer less information than Knossos on wool economy, but more on flax and linen, a fact which might also partly reflect different times of year for the destruction of both palaces and their archives.¹⁵² It can also be argued, when comparing the flock records at Knossos and Pylos, that Pylos texts might represent, if not different administrative methods, at least, a different stage or focus of information recording. The organisation of production and the corresponding structures (*o-pi* workshops, */do/* or */wo-ko/* structures) seem to vary according to the site considered — if this is not due to the chance of findings, which can never be excluded. They might have been adapted to the size, organisation and administrative structures of the territories concerned, depending also on factors such as the history of the polities, which is mostly merely a subject of speculation for us (probably a Minoan heritage for Mycenaean Knossos; and similarly for the relationship between Thebes and the island of Euboea).¹⁵³ The aspects of wool economy relating to the manufacture of textiles will be treated in the chapter by M.-L. Nosch.

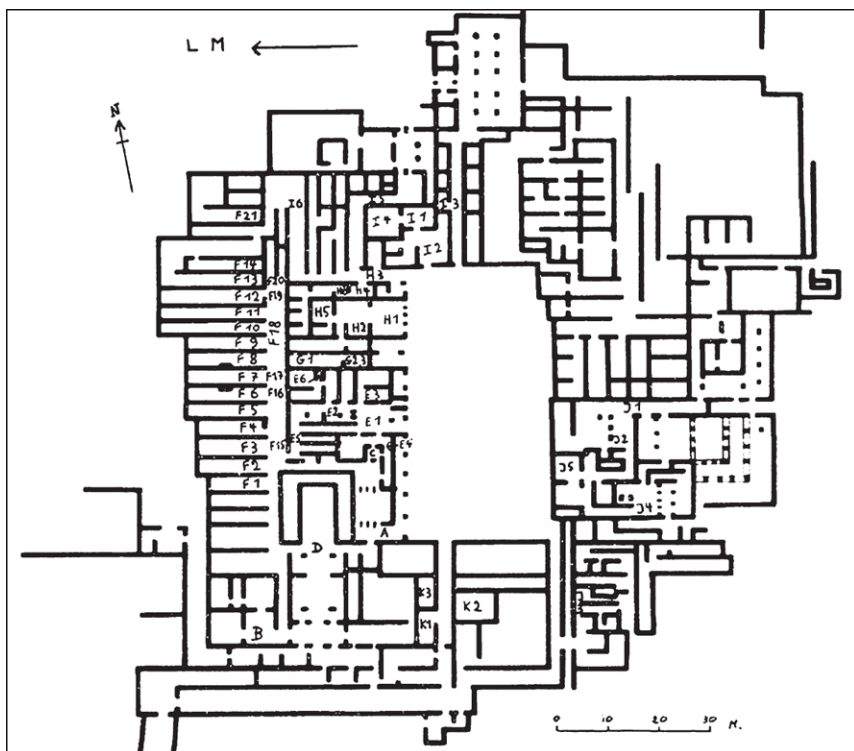


Fig. 18.10. Map of the Knossos palace with findspots of Linear B tablets (Olivier 1967b).



Fig. 18.11. Map of the Pylos palace (courtesy P. Darcque).

Abbreviations

AJ	American Journal of Archaeology
AM	Athenische Mitteilungen
AS	Ateneion della Scuola Archeologica di Atene
BAR	British Archaeological Reports. International Series
BCH	Bulletin de correspondance hellénique
BÉFAR	Bibliothèque des Ecoles françaises d'Athènes et de Rome
BICS	Bulletin of the Institute of Classical Studies
BSA	Annual of the British School at Athens
JHS	Journal of Hellenic Studies
LAO	Littérature Ancienne du Proche-Orient
NuA	Numismatica e antichità classiche
OJA	Oxford Journal of Archaeology
ON	Orientalia Nova Series
PP	Parola del Passato
RP	Revue de Philologie
SIM	Studies in Mediterranean Archaeology
SMEA	Studi micenei ed egeo-anatolici
TPS	Transactions of the Philological Society
ZA	Zeitschrift für Assyriologie
ZIVA	Ziva Antika

Bibliography

- Alberti M. E. (2003) I sistemi ponderali dell'Egeo nell'Età del Bronzo. Studi, storia, pratica e contatti. *ASAtene* 81, 597–640.
- Alberti M. E. (2006) La prima porpora: primato etnico o comune patrimonio mediterraneo? In *Studi di protostoria in onore di Renato Peroni*, 733–736. Florence.
- Alberti M. E. (2007) The Minoan Textile Industry and the Territory from Neopalatial to

- Mycenaean Times: Some First Thoughts. *Creta Antica* 8, 243–263.
- Alberti M. E. (2008) Murex Shells as Raw Material: The Purple-dye Industry and its By-products. Interpreting the Archaeological Record. *KASKAL* 5, 73–90.
- Alberti M. E. (2011a) Redistribuzione e commercio? Il sistema di traffici miceneo. In N. Parise, M. E. Alberti and C. Martinelli, Reciprocità e ridistribuzione: modelli meccanici e modelli statistici. In V. Nizzo (ed.), *Dalla nascita alla morte: antropologia e archeologia a confronto, Atti dell'Incontro Internazionale di Studi in onore di Claude Lévi-Strauss*, Roma 21 maggio 2010, 346–359. Rome.
- Alberti M. E. (2011b) La levantinizazione dei sistemi ponderali nell'Egeo dell'Età del Bronzo. In E. Ascalone and L. Peyronel (eds), *Studi italiani di metrologia ed economia del Vicino Oriente antico dedicati a Nicola Parise in occasione del suo settantesimo compleanno*, *Studia Asiana* 7, 1–41. Rome.
- Alberti M. E., Aravantinos V., Del Freo M., Fappas Y., Papadaki A. and Rougemont Fr. (2012). Textile Production in Mycenaean Thebes. A First Overview. In R. Laffineur and M.-L. Nosch (eds), *KOSMOS. Jewellery, Adornment and Textiles in the Aegean Bronze Age. Proceedings of the 13th International Aegean Conference/13e Rencontre égéenne internationale, University of Copenhagen, Danish National Research Foundation's Centre for Textile Research*, 21–26 April 2010, 87–106. Aegaeum 33. Leuven.
- Andersson E. and Nosch M.-L. (2003) With a Little Help from my Friends. In K. P. Foster and R. Laffineur (eds), *METRON. Measuring the Aegean Bronze Age, 9th International Aegean Conference/9e Rencontre Egéenne Internationale, organized by the University of Liège and Yale University/organisée par l'Université de Liège et l'Université de Yale*, Yale University, 18–21 April 2002, 197–208. Aegaeum 24. Liège.
- Andrikou E., Aravantinos V., Godart L., Sacconi A. and Vroom J. (eds) (2006) *Thèbes. Fouilles de la Cadmée, II.2. Les tablettes en linéaire B de la Odos Pelopidou. Le contexte archéologique. La céramique de la Odos Pelopidou et la chronologie du linéaire B*. Pisa, Rome.
- Aravantinos V. (1990) The Mycenaean Inscribed Sealings from Thebes: Problems of Content and Function. In Th. G. Palaima (ed.), *Aegean Seals, Sealings and Administration. Proceedings of the NEH-Dickson Conference of the Program in Aegean Scripts and Prehistory of the Department of Classics, University of Texas at Austin, January 11–13, 1989*, 149–176. Aegaeum 5. Liège.
- Aravantinos V. (2008 [2010]) Τα τοπωνυμικά των αρχαίων γραμμικής Β των Θηβών: συμβολή στη μυκηναϊκή γεωγραφία της Βοιωτίας. In *Actes du IVème congrès de la société des études béotiennes, Livadeia, 9–13 septembre 2000*, 123–180. Athens.
- Aravantinos V., Del Freo M., Godart L. and Sacconi A. (2005) *Thèbes. Fouilles de la Cadmée IV. Les textes de Thèbes (1–433). Translittération et tableau des scribes. Bibliotheca di Pasiphae* 4. Pisa, Rome.
- Aravantinos V., Alberti M. E. (2006) The Balance Weights from the Kadmeia, Thebes. In M. E. Alberti, E. Ascalone and L. Peyronel (eds), *Weights in Context. Bronze Age Weighing Systems of Eastern Mediterranean: Chronology, Typology, Material and Archaeological Contexts. Proceedings of the International Colloquium held at the University of Rome La Sapienza, 22–24 November 2004*, 293–314. Rome.
- Aravantinos V. and Vasilogamvrou A. (2012). The First Linear B Documents from Ayios Vasileios (Laconia). In P. Carlier, Ch. de Lamberterie, M. Egetmeyer, N. Guilleux, Fr. Rougemont and J. Zurbach (eds), *Etudes mycéniennes 2010. Actes du XIIIe colloque international sur les textes égéens. Sèvres, Paris, Nanterre, 20–23 septembre 2010*. Biblioteca di 'Pasiphae' X, 41–54. Pisa, Rome.
- Baurain Cl. (1984) *Chypre et la Méditerranée orientale au Bronze récent. Synthèse historique, Etudes chypriotes* VI. Paris.
- Beck L. Y. and Beck C. W. (1978) WI-RI-ZA Wool on Linear B Tablets of Perfume Ingredients. *AJA* 82, 213–215.
- Bendall L. M. (2007) *Economics of Religion in the Mycenaean World: Resources Dedicated to Religion in the Mycenaean Palace Economy*. Oxford University School of Archaeology Monograph 67. Oxford.
- Bennet J. (1992) 'Collectors' or 'Owners'? An Examination of their Possible Functions within the Palatial Economy of LM III Crete. In J.-P. Olivier (ed.) *MYKENAÏKA. Actes du IXe Colloque international sur les textes mycéniens et égéens organisé par le Centre de l'Antiquité Grecque et Romaine de la Fondation Hellénique des Recherches Scientifiques et l'École française d'Athènes (Athènes, 2–6 octobre 1990)*. *BCH suppl.* 25, 65–101. Athens.

- Bennett E. L. and Olivier J.-P. 1973 *The Pylos Tablets Transcribed. Part I. Text and Notes, Incunabula Graeca* LI. Rome.
- Bennett, E. L. Jr., J. M. Driessen, L. Godart, J. T. Killen, C. Kopaka, J. L. Melena, J.-P. Olivier and M. Perna (1989) 436 raccords et quasi-raccords de fragments inédits dans KT 5. *Minos* 24, 199–242.
- Betancourt, P. P. (1985) *The History of Minoan Pottery*. Princeton.
- Boëlle C. (2004). *PO-TI-NI-JA. L'élément féminin dans la religion mycénienne (d'après les archives en linéaire B)*, *Etudes anciennes* 26. Nancy.
- Bonnet C. (1995= 'L'interprète des Crétois' (phén. *mls* [h]krsym). De Mari aux Phéniciens de Kition en passant par Ougarit. *SMEA* 36, 113–123.
- Carlier P. (1992) Les collecteurs sont-ils des fermiers? In J.-P. Olivier (ed.) *MYKENAÏKA. Actes du IXe Colloque international sur les textes mycéniens et égéens organisé par le Centre de l'Antiquité Grecque et Romaine de la Fondation Hellénique des Recherches Scientifiques et l'École française d'Athènes (Athènes, 2–6 octobre 1990)*. *BCH suppl.* 25, 159–166. Athens.
- Chadwick J. (1964) Pylos Tablet Un 1322. In E. L. Bennett J. (ed.), *Mycenaean Studies. Proceedings of the Third International Colloquium for Mycenaean Studies held at 'Wingspread', 4–8 September 1961*, 19–26. Madison.
- Chadwick J. (1976) *The Mycenaean World*. Cambridge.
- Darcque P. and Rougemont Fr. (forthcoming). Palaces and 'Palaces': Mycenaean Texts and Contexts in the Argolid and Neighbouring Regions. In A.-L. Schallin (ed.), *Mycenaeans Up To Date: The Archaeology of the NE Peloponnese – Current Concepts and Future Directions. Conference Organized by the Swedish Institute at Athens, 10–14 November 2010*.
- De Fidio P. (1998–1999) On the Tracks of Aegean Bronze Age Wool and Weights. In J. Bennet and J. Driessen (eds), *A-NA-QO-TA. Studies Presented to J. T. Killen, Minos* 33–34, 39–63. Salamanca.
- De Fidio P. (1999) Le poids mycénien de la laine. In S. Deger-Jalkotzy, St. Hiller and O. Panagl (eds), *Floreat Studia Mycenaea. Akten des 10. Internationalen Mykenologischen Kolloquiums in Salzburg vom 30. April-6. Mai 1995*, vol. 1, 195–204. Vienna.
- Del Freo M. (2009) The Geographical Names in the Linear B Texts from Thebes. *Pasiphae* 3, 41–68.
- Del Freo M. (2012) Rapport 2006–2010 sur les textes en écriture hiéroglyphique crétoise, en linéaire A et en linéaire B. In P. Carlier, Ch. de Lamberterie, M. Egetmeyer, N. Guilleux, Fr. Rougemont and J. Zurbach (eds), *Etudes mycéniennes 2010. Actes du XIIIe colloque international sur les textes égéens. Sèvres, Paris, Nanterre, 20–23 septembre 2010*, *Biblioteca di 'Pasiphae'* X, 3–22, Pisa, Rome.
- Del Freo M., Nosch M.-L. and Rougemont Fr. (2010) The Terminology of Textiles in the Linear B Tablets, Including some Considerations on Linear A Logograms and Abbreviations. In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and the Mediterranean from the Third to the First Millennia BC*, 338–373. *Ancient Textiles Series* 8. Oxford.
- Del Freo M. and Rougemont Fr. (2012) Observations sur la série Of de Thèbes. *SMEA* 54, 263–280.
- Driessen J. (1990) *An Early Destruction in the Mycenaean Palace at Knossos: A New Interpretation of the Excavation Field-Notes of the South-East Area of the West Wing*. Leuven.
- Driessen J. (1992) 'Collector's Items'. Observations sur l'élite mycénienne de Cnossos. In J.-P. Olivier (ed.) *MYKENAÏKA. Actes du IXe Colloque international sur les textes mycéniens et égéens organisé par le Centre de l'Antiquité Grecque et Romaine de la Fondation Hellénique des Recherches Scientifiques et l'École française d'Athènes (Athènes, 2–6 octobre 1990)*. *BCH suppl.* 25, 197–214. Athens.
- Driessen J. (2000). *The Scribes of the Room of the Chariot Tablets at Knossos. Interdisciplinary Approach to the Study of a Linear B Deposit*, *Minos Suplementos* 15. Salamanca.
- Duhoux Y. (1976) *Aspects du vocabulaire économique mycénien (cadastre – artisanat – fiscalité)*. Amsterdam.
- Durand J.-M. (1999) La façade occidentale du Proche-Orient d'après les textes de Mari. In A. Caubet (ed.), *L'acrobate au taureau: Les découvertes de Tell el-Dab'a (Égypte) et l'archéologie de la Méditerranée orientale (1800–1400 av. J.-C.)*. *Actes du Colloque organisé au Musée du Louvre par le Service culturel le 3 décembre 1994*, 149–164. Paris.

- Firth R. (2007) Re-considering Alum on the Linear B Tablets. In C. Gillis and M.-L. Nosch (eds), *Ancient Textiles: Production, Craft and Society. Proceedings of the Conference held in Lund/Falsterbo, Sweden, and Copenhagen, Denmark, on 19–23 March 2003*, 130–138. Oxford.
- Firth R. (2012) An Interpretation of the Specifications of Textiles on Ln 1568. In P. Carlier, Ch. de Lamberterie, M. Egetmeyer, N. Guilleux, Fr. Rougemont and J. Zurbach (eds), *Etudes mycéniennes 2010. Actes du XIIIe colloque international sur les textes égéens*. Sevres, Paris, Nanterre, 20–23 septembre 2010. *Bibliothèque de 'Pasiphae'* X, 227–242. Pisa-Rome.
- Godart L. (1968) Kupirijo dans les textes mycéniens. *SMEA* 5, 64–70.
- Godart L. (1969) La série Fh de Knossos. *SMEA* 8, 39–65.
- Godart L. (1987) La série Fh de Knossos, vingt ans après... In J. T. Killen, J. L. Melena and J.-P. Olivier (eds), *Studies in Mycenaean and Classical Greek presented to John Chadwick*. *Minos* 20–22, 201–210. Salamanca.
- Godart L. (1992) Les collecteurs dans le monde égéen. In J.-P. Olivier (ed.) *MYKENAÏKA. Actes du IXe Colloque international sur les textes mycéniens et égéens organisé par le Centre de l'Antiquité Grecque et Romaine de la Fondation Hellénique des Recherches Scientifiques et l'École française d'Athènes (Athènes, 2–6 octobre 1990)*. *BCH suppl.* 25, 257–283. Athens.
- Halstead P. (1998–1999) Texts, Bones and Herders: Approaches to Animal Husbandry in Late Bronze Age Greece. In J. Bennet and J. Driessen (eds), *A-NA-QO-TA. Studies Presented to J. T. Killen*, *Minos* 33–34, 149–189. Salamanca.
- Halstead P. (2003) Texts and Bones: Contrasting Linear B and Archaeozoological Evidence for Animal Exploitation in Mycenaean Southern Greece. In E. Kotjabopoulou, Y. Hamilakis, P. Halstead, C. Gamble, P. Elefanti (eds), *Zoarchaeology in Greece: Recent Advances*. *BSA Studies* 9, 257–261. London.
- Halstead P. and Isaakidou V. (2004) Faunal Evidence for Feasting: Burnt Offerings from the Palace of Nestor at Pylos. In P. Halstead, J. C. Barrett (eds), *Food and Society in Prehistoric Greece*, 136–154. *Sheffield Studies in Aegean Archaeology* 5. Oxford.
- Hamilakis Y. and Konsolaki E. (2004) Pigs for the Gods: Burnt Animal Sacrifices as Embodied Rituals at a Mycenaean Sanctuary. *OJA* 23:2, 135–151.
- Iakovidis Sp., Godart L. and Sacconi A. (2012) Les inscriptions en linéaire B découvertes dans la 'Maison de Petsas' à Mycènes. *Pasiphae* 12, 47–57.
- Immerwahr S. 1990 *Aegean Painting in the Bronze Age*. Philadelphia.
- Jarman M. R. and Jarman H. N. (1968) The Fauna and Economy of Early Neolithic Knossos. *BSA* 63, 241–264.
- Killen J. T. (1962a) Mycenaean po-ka: A Suggested Interpretation. *PP* 17, 26–31.
- Killen J. T. (1962b) The Wool Ideogram in Linear B Texts. *Hermathena* 96, 38–72.
- Killen J. T. (1963a) Some Adjuncts to the Sheep Ideogram on the Knossos Tablets. *Eranos* 61, 69–93.
- Killen J. T. (1963b) Mycenaean po-ka: A Further Note. *PP* 18, 447–450.
- Killen J. T. (1964) The Wool Industry in Crete in the Late Bronze Age. *BSA* 59, 1–15.
- Killen J. T. (1966) The Knossos Lc (Cloth) Tablets. *BICS* 13, 105–109.
- Killen J. T. (1968) The Knossos o-pi Tablets. In C. Gallavotti (ed.), *Atti e Memorie del 1° Congresso Internazionale di Micenologia (Roma 27 settembre-3 ottobre 1967)*, *Incunabula Graeca* 25:2, 636–643. Rome.
- Killen J. T. (1974) A Problem in the Knossos Lc(l) (Cloth) Tablets. *Hermathena* 118, 82–90.
- Killen J. T. (1976) Linear B a-ko-ra-ja/-jo. In A. Morpurgo Davies and W. Meid (eds), *Studies in Greek, Italic, and Indo-European Linguistics, Offered to Leonard R. Palmer on the Occasion of His Seventieth Birthday*, *Innsbrucker Beiträge zur Sprachwissenschaft* 16, 117–125. Innsbruck.
- Killen J. T. (1979) The Knossos Ld(1) Tablets. In E. Risch and H. Mühlestein (eds), *Colloquium Mycenaeanum. Actes du sixième colloque international sur les textes mycéniens et égéens tenu à Chaumont sur Neuchâtel du 7 au 13 septembre 1975*, 151–181. Neuchâtel and Geneva.
- Killen J. T. (1983) Mycenaean Possessive Adjectives in -e-jo. *TPhS* 113, 66–99.
- Killen J. T. (1992) Observations on the Thebes Sealings. In J.-P. Olivier (ed.), *MYKENAÏKA. Actes du IXe Colloque international sur les textes mycéniens et égéens organisé par le Centre de l'Antiquité Grecque et Romaine de la Fondation Hellénique des Recherches Scientifiques et l'École française d'Athènes (Athènes, 2–6 octobre 1990)*. *BCH suppl.* 25, 365–380. Athens.
- Killen J. T. (1993) Records of Sheep and Goats at Mycenaean Knossos and Pylos. *Bulletin on Sumerian Agriculture* 7, 209–218.

- Killen J. T. (1994) Thebes Sealings, Knossos Tablets and Mycenaean State Banquets. *BICS* 40, 67–84.
- Killen J. T. (1995) Some Further Thoughts on 'Collectors'. In R. Laffineur R. and W.-D. Niemeier (eds), *POLITEIA. Society and State in the Aegean Bronze Age. Proceedings of the 5th International Aegean Conference / 5e Rencontre égéenne internationale, University of Heidelberg, Archäologisches Institut, 10–13 April 1994*. *Aegaeum* 12, 213–224. Liège and Austin.
- Killen J. T. (1996) Thebes Sealings and Knossos Tablets. In E. De Miro, L. Godart and A. Sacconi (eds), *Atti e Memorie del Secondo Congresso Internazionale di Micenologia, Roma-Napoli, 14–20 ottobre 1991. Incunabula Graeca*, XCVIII I, 71–82. Rome.
- Killen J. T. (1996–97) [1999] The Find-places of the Tablets from the Western Magazines at Knossos: Some Matters Arising. *Minos* 31–32, 123–132.
- Killen J. T. (1999) Mycenaean o-pa. In S. Deger-Jalkotzy, St. Hiller and O. Panagl (eds), *Floerant Studia Mycenaea. Akten des 10. Internationalen Mykenologischen Kolloquiums in Salzburg vom 30. April–6. Mai 1995, vol. 2*, 325–342. Vienna.
- Killen J. T. (2001) Some Thoughts on ta-ra-si-ja. In S. Voutsaki and J. T. Killen (eds), *Economy and Politics in Mycenaean Palace States. Cambridge Philological Society, supplementary volume 27*, 161–180. Cambridge.
- Killen J. T. (2002–2003) The Wm Nodules from Knossos. *Minos* 37–38, 101–106.
- Killen J. T. and Olivier J.-P. (1989) *The Knossos Tablets. A Transliteration. Fifth Edition, Suplementos a Minos* 11. Salamanca.
- Knox M. O. (1970) 'House' and 'Palace' in Homer. *JHS* 90, 117–120.
- Kolodny E. (1966) La population des îles en Méditerranée. *Méditerranée* 7/1, 3–31.
- Kotjabopoulou E., Hamilakis Y., Halstead P., Gamble C. and Elefanti P. (eds) (2003) *Zooarchaeology in Greece. Recent Advances*. British School at Athens Studies 9. London.
- Kraus F. R. (1966) *Staatliche Viehhaltung im altbabylonischen Lande Larsa*. Amsterdam.
- Lackenbacher S. (2002) *Textes akkadiens d'Ugarit. Textes provenant des 25 premières campagnes, LAPO*. Paris.
- Lamberterie Ch. de (1992) Le problème de l'homonymie: les trois verbes ὀφέλλω en grec ancien. In Fr. Létoublon (ed.), *La langue et les textes en grec ancien. Actes du colloque Pierre Chantraine, 5–8 septembre 1989*, 201–217. Amsterdam.
- Landenius-Enegren H. (2008) *The People of Knossos. Prosopographical Studies in the Knossos Linear B Archives, Boreas* 30. Uppsala.
- Le Feuvre Cl. (1997) La forme épique du nom de la maison. *RPh* 71, 217–226.
- Lejeune M. (1958) Etudes de philologie mycénienne. 1. Langue, écriture, orthographe. 2. Les tablettes pyliennes de la série Ma. In M. Lejeune (ed.), *Mémoires de philologie mycénienne. Première série* (1957–1958), 59–91. Paris. Lejeune M. (1971a) Notes mycénienes: 1. potinijawejo. 2. ekaraewe. 3. oreomoakereu. 4. rekeetoroterijo. In M.
- Lejeune (ed.), *Mémoires de philologie mycénienne. Deuxième série* (1958–1963), 357–376. Paris.
- Lejeune (1971b) De quelques idéogrammes mycéniens. In M. Lejeune (ed.), *Mémoires de philologie mycénienne. Deuxième série* (1958–1963), 141–166. Paris.
- Lejeune M. (1976) ΔΩ 'maison'. *SMEA* 17, 79–84.
- Lupack S. (2008) *The Role of the Religious Sector in the Economy of Late Bronze Age Mycenaean Greece*. BAR IS 1858. Oxford.
- Marinatos Sp. (1974) *Excavations at Thera VI*. Athens.
- Melena J. L. (1974) Reflexiones sobre los meses del calendario micénico de Cnoso y sobre la fecha de la caída del palacio. *Emerita* 42, 77–102.
- Melena J. L. (1987a) On Untransliterated Syllabograms *56 and *22. In P. H. Ilievski and L. Crepajac (eds), *Tractata Mycenaea. Proceedings of the Eighth International Colloquium on Mycenaean Studies, held in Ohrid, 15–20 September 1985*, 203–232. Skopje.
- Melena J. L. (1987b) On the Linear B Ideogrammatic Syllabogram ZE. In J. T. Killen, J. L. Melena and J.-P. Olivier (eds), *Studies in Mycenaean and Classical Greek presented to John Chadwick. Minos* 20–22, 389–457. Salamanca.
- Melena J. L. and Olivier J.-P. (1991) *TITHEMY. The Tablets and Nodules in Linear B from Tiryns, Thebes and Mycenae. A Revised Transliteration. Suplementos a Minos* 12. Salamanca.
- Militello P. (2007) Textile Industry and Minoan Palaces. In C. Gillis and M.-L. Nosch (eds), *Ancient Textiles: Production, Craft and Society. Proceedings of the conference held in Lund/Falsterbo, Sweden, and Copenhagen, Denmark, on 19–23 March 2003*, 36–45. Oxford.

- Moody J. (2012) Hinterlands and Hinterseas: Resources and Production Zones in Bronze Age and Iron Age Crete. In M. Iacovou, G. Cadogan, J. Whitley and C. Kopaka (eds), *Parallel Lives: Ancient Island Societies in Crete and Cyprus*. BSA Studies 20, 233–271. London.
- Morgan L. 1988 *The Miniature Wall Paintings from Thera: A Study in Aegean Culture and Iconography*. Cambridge Classical Studies. Cambridge.
- Nosch M.-L. (1997–2000 [2001]) The Geography of the ta-ra-si-ja Obligation. *Aegean Archaeology* 4, 27–44.
- Nosch M.-L. (2000a) Acquisition and Distribution: ta-ra-si-ja in the Mycenaean Textile Industry. In C. Gillis, C. Risberg and B. Sjöberg (eds), *Trade and Production in Premonetary Greece. Acquisition and Distribution of Raw Materials and Finished Products. Proceedings of the 6th International Workshop, Athens, 1996*, SIMA Pocketbook 154, 42–62. Jonsared.
- Nosch M.-L. (2000b) *The Organization of the Mycenaean Textile Industry*. Unpublished PhD, University of Salzburg.
- Nosch M.-L. (2000c) Schafherden unter dem Namenspatronat von Potnia und Hermes in Knossos. In F. Blakolmer (ed.), *Österreichische Forschungen zur ägäischen Bronzezeit 1998. Akten der Tagung am Institut für klassische Archäologie der Universität Wien, 2.-3. Mai 1998*, 211–216. Vienna.
- Nosch M.-L. B. (2001 [2002]) Entre collecteurs et travailleurs: les ‘responsables’ dans l’industrie textile de Cnossos. In P. Carlier (ed.), *Actes de Journées égéennes, Paris, 8–10 mars 1999*. *Ktèma* 26, 133–144. Strasbourg.
- Nosch M.-L. (2004) Red Colored Mycenaean Cloth. In L. Cleland, K. Stears and G. Davies (eds), *Colors in Antiquity. Papers given at the Color Conference, Dept. of Classics, University of Edinburgh, 10–13 September*. BAR IS 1267, 32–39. Oxford.
- Nosch M.-L. (2006) More Thoughts on the Mycenaean ta-ra-si-ja System. In M. Perna (ed.) *Fiscality in Mycenaean and Near Eastern Archives. Proceedings of the Conference held at Soprintendenza Archivistica per la Campania, Naples 21–23 October 2004*. *Studi egei e vicinorientali* 3, 161–182. Paris.
- Nosch M.-L. (2007) *The Knossos Od Series. An Epigraphical Study*, Veröffentlichungen der Mykenische Kommission Band 25. Mykenische Studien 20. Österreichische Akademie der Wissenschaften, Philosophisch-historischen Klasse, Denkschriften, 347. Vienna.
- Nosch M.-L. 2008 The Textile Industry of the Kadmeia. In V. Aravantinos (ed.) *4th International Congress of Boiotian Studies, held at Levadeia, September 2000*, 191–202. Athens.
- Nosch M.-L. (2009) Les allocations de laine des tablettes en linéaire B de Thèbes. *Kadmos* 48, 77–92.
- Olivier J.-P. (1967a) L’industrie textile dans la Grèce mycénienne. *SMEA* 4, 120–121.
- Olivier J.-P. (1967b) *Les scribes de Cnossos*. *Incunabula Graeca* XVII, Rome.
- Olivier J.-P. (1967c) La série Dn de Cnossos. *SMEA* 2, 71–93.
- Olivier J.-P. (1972) La série Dn de Cnossos reconsidérée. *Minos* 13, 22–28.
- Olivier J.-P. (1996–1997) El comercio micénico desde la documentación epigráfica. *Minos* 31–32, 275–292.
- Olivier J.-P. (2001) Les ‘collecteurs’: leur distribution spatiale et temporelle. In S. Voutsaki and J. T. Killen (eds), *Economy and Politics in Mycenaean Palace States*, Cambridge Philological Society, supplementary volume 27, 139–160. Cambridge.
- Palaima Th. G. (1989) Perspectives on the Pylos Oxen Tablets: Textual (and Archaeological) Evidence for the use and Management of Oxen in Late Bronze Age Messenia (and Crete). In Th. G. Palaima, C. W. Shelmerdine, and P. H. Ilievski (eds), *Studia Mycenaea* 198. ZAnt. Monographies 7, 85–124. Skopje.
- Palaima Th. G. (1991) Maritime Matters in the Linear B Tablets. In R. Laffineur and L. Basch (eds), *Thalassa. L’Égée préhistorique et la mer. Actes de la troisième rencontre égéenne internationale de l’Université de Liège, Station de recherches sous-marines et océanographiques (StaReSo), Calvi, Corse, 23–25 avril 1990*, 273–310. Aegaeum 7. Liège.
- Palaima Th. G. (1992) The Knossos Oxen Dossier: The Use of Oxen in Mycenaean Crete. Part I: General Background and Scribe 107. In J.-P. Olivier (ed.), *MYKENAIKA. Actes du IXe Colloque international sur les textes mycéniens et égéens organisé par le Centre de l’Antiquité Grecque et Romaine de la Fondation Hellénique des Recherches Scientifiques et l’École française d’Athènes (Athènes, 2–6 octobre 1990)*, 463–474. BCH suppl. 25. Athens.
- Palmer L. R. (1963) *The Interpretation of Mycenaean Greek Texts*. Oxford.

- Parise N. (1991) Dai pesi egei per la lana alla mina di Dudu. *NumAntCl* 20, 13–16.
- Parise N. (2009) Pesi egei per la lana. In N. Parise (ed.), *Pesi e misure nel Mediterraneo orientale prima della moneta*, 93–100. Rome (reprinted from a 1986 study).
- Perna M. (2004) *Recherches sur la fiscalité mycénienne. Etudes Anciennes* 28. Nancy.
- Perna M. (2005) L'alun dans les documents en linéaire B. In P. Borgard, J.-P. Brun and M. Picon (eds), *L'alun de Méditerranée. Colloque international, Naples, 4–6 juin 2003, Lipari, 7–8 juin 2003. Collection du centre Jean Bérard* 23, 39–42. Naples, Aix en Provence.
- Petrakos V. (2010) ΙΚΑΙΝΑ ΜΕΣΣΗΝΙΑΣ, ΤΟ ΕΡΓΟΝ ΤΗΣ ΑΡΧΑΙΟΛΟΓΙΚΗΣ ΕΤΑΙΡΕΙΑΣ 57, 26–27.
- Petruso K. M. (1986) Wool-evaluation at Knossos and Nuzi. *Kadmos* 25, 26–37.
- Piteros Chr., Olivier J.-P. and Melena J. L. (1990). Les inscriptions en linéaire B des nodules de Thèbes (1982): la fouille, les documents, les possibilités d'interprétation. *BCH* 114, 103–184.
- Postgate J. N. (1975) Some Old Babylonian Shepherds and their Flocks, *Journal of Semitic Studies* 20, 1–21.
- Risch E. (1972) La formation du mot *po-ti-ni-ja-we-jo*. In M. S. Ruipérez (ed.), *Acta Mycenaea. Actes du cinquième Colloque international des études mycéniennes, tenu à Salamanque, 30 mars-3 avril 1970. Volume II*, 294–300. Salamanca.
- Robkin A. L. H. (1979) The Agricultural Year, the Commodity SA and the Linen Industry of Mycenaean Pylos. *AJA* 83, 469–474.
- Rougemont Fr. (2001) Some Thoughts on the Identification of the 'Collectors' in the Linear B Tablets. In S. Voutsaki and J. T. Killen (eds), *Economy and Politics in Mycenaean Palace States. Cambridge Philological Society, supplementary volume* 27, 129–138. Cambridge.
- Rougemont Fr. (2004) The Administration of Mycenaean Sheep Rearing (Flocks, Shepherds, 'Collectors'). In B. Frizell (ed.) *PECUS. Man and Animal in Antiquity. Proceedings of the Conference Held in Rome, September 11–15, 2002*, 24–34. The Swedish Institute in Rome, Projects and Seminars 1. Rome.
- Rougemont Fr. (2005) Les noms des dieux dans les tablettes inscrites en linéaire B. In N. Belayche, P. Brulé, G. Freyburger, Y. Lehmann, L. Pernot and Fr. Prost (eds), *Nommer les dieux. Théonymes, épithètes, épiclèses dans l'Antiquité. Recherches sur les rhétoriques religieuses* 5, 325–388. Turnhout.
- Rougemont Fr. (2006) Les porcs dans le monde mycénien: données archéologiques et épigraphiques. In Br. Lion and C. Michel (eds), *Les suidés au Proche Orient ancien: de la domestication au tabou. Colloque international de Nanterre, du 1 au 3 décembre 2005*, 115–129. Paris.
- Rougemont Fr. (2007) Flax and Linen Textiles in the Mycenaean Palatial Economy. In C. Gillis and M.-L. Nosch (eds), *Ancient Textiles: Production, Craft and Society. Proceedings of the Conference Held in Lund/Falsterbo, Sweden, and Copenhagen, Denmark, on 19–23 March 2003*, 46–49. Oxford.
- Rougemont Fr. (2007–2008 [2010]) Les phases de la production textile à l'époque mycénienne, de la fibre textile au produit fini: aperçu des données épigraphiques. In C. Breniquet (ed.), *Systèmes de production et de circulation. Le travail du fil. Journée organisée par la MAE, 16 juin 2008, Cahiers des thèmes transversaux ArScAn IX*, 37–46. Paris.
- Rougemont Fr. (2008) Textile Production and the Mycenaean Sanctuaries. In C. Gillis and B. Sjöberg (eds), *Crossing Borders. Proceedings of the 7th, 8th and 9th International Workshops, Athens, 1997–1999*, 287–303. *SIMA Pocketbook* 173. Sävedalen.
- Rougemont Fr. (2009) *Contrôle économique et administration à l'époque des palais mycéniens (fin du II^{ème} millénaire av. J.-C.)*. BEFAR 332. Athens.
- Rougemont Fr. (forthcoming) Les allocations de laine à Nuzi et dans le monde égéen. In *Palatial Economy in the Ancient Near East and in the Aegean: First Steps Towards a Comprehensive Study and Analysis. ESF Exploratory Workshop Convened by Pierre CARLIER, Francis JOANNES, Sèvres (France), September 17–18, 2010*.
- Ruijgh C. (1967a) À propos de myc. po-ti-ni-ja-we-jo. *SMEA* 4, 40–52.
- Ruijgh C. (1967b) *Études sur la grammaire et le vocabulaire du grec mycénien*. Amsterdam.
- Rystedt E. (1987) Vases in the Shape of Hedgehogs – Mycenaean and Later. *Medelhavsmuseet Bulletin* 22, 28–39.
- Sacconi A. (2012) Il supplemento al corpus delle iscrizioni vascolari in lineare B. In P. Carlier, Ch. de Lamberterie, M. Egetmeyer, N. Guilleux, Fr. Rougemont and J. Zurbach (eds), *Études*

- mycénienes 2010. Actes du XIII^e colloque international sur les textes égéens. Sevres, Paris, Nanterre, 20–23 septembre 2010. Biblioteca di 'Pasiphae' X, 123–142. Pisa-Rome.
- Sacconi A. (2012) Il supplemento al corpus delle iscrizioni vascolari in lineare B. In P. Carlier, Ch. de Lamberterie, M. Egetmeyer, N. Guilleux, Fr. Rougemont, J. Zurbach (eds), *Etudes mycénienes 2010. Actes du XIII^e colloque international sur les textes égéens. Sèvres, Paris, Nanterre, 20–23 septembre 2010. Biblioteca di 'Pasiphae' X*, 123–142. Pisa, Rome.
- Schallin A.-L. and Pakkanen P. (eds) 2000 *Encounters with Mycenaean Figures and Figurines. Papers Presented at a Seminar at the Swedish Institute at Athens, 27–29 April 2001*. Skrifter utgivna av Svenska institutet i Athen, 8^e 20. Stockholm.
- Shelmerdine C. W. (1985) *The Perfume Industry in Mycenaean Pylos*. SIMA-PocketBook 34. Göteborg.
- Shelmerdine C. W. (2012) Iklaia Tablet IK X 1. In P. Carlier, Ch. de Lamberterie, M. Egetmeyer, N. Guilleux, Fr. Rougemont and J. Zurbach (eds), *Etudes mycénienes 2010. Actes du XIII^e colloque international sur les textes égéens. Sèvres, Paris, Nanterre, 20–23 septembre 2010. Biblioteca di 'Pasiphae' X*, 75–78. Pisa, Rome.
- Shelton K. (2002–2003) A New Linear B Tablet from Petsas House, Mycenae. *Minos* 37–38, 387–396.
- Sloan R. E. and Duncan M. A. (1978). Zooarchaeology of Nichoria. In G. Rapp Jr and S. E. Aschenbrenner (eds), *Excavations at Nichoria in Southwest Greece. I. Site, Environs and Techniques*, 60–77. Minneapolis.
- Spyropoulos Th. G. and Chadwick J. (1975). *The Thebes Tablets II. Suplementos a Minos* 4. Salamanca.
- Thompson R. (2000–2001 [2002]) Prepositional Usage in Arcado-Cypriot and Mycenaean: A Bronze Age Isogloss? *Minos* 35–36, 395–430.
- Toti O. 1996 L'allume nel processo economico dei monti della Tolfa nel periodo delle testimonianze micenee. In E. De Miro, L. Godart and A. Sacconi (eds), *Atti e Memorie del Secondo Congresso Internazionale di Micenologia, Roma-Napoli, 14–20 ottobre 1991, Incunabula Graeca*, vol. XCVIII:2, 911–921. Rome.
- Tournavitu I. (1995) *The 'Ivory Houses' at Mycenae*. BSA supplement 24. London.
- Trantalidou K. (1990) Animals and Human Diet in the Prehistoric Aegean. In *Thera and the Aegean World III. Proceedings of the Third International Congress, Santorini, Greece, 3–9 September, 1989*, 392–403. London.
- Trantalidou K. (2000) Animal Bones and Animal Representations at Late Bronze Age Akrotiri. In S. Sherratt (ed.) *The Wall Paintings of Thera. Proceedings of the First International Symposium, Petros M. Nomikos Conference Centre, Thera, Hellas, 30 August-4 September 1997*, vol. 2, 709–735. Athens.
- Treuil R., Darcque P., Poursat J.-Cl., Touchais G. 2008 *Les civilisations égéennes du Néolithique et de l'âge du Bronze. Deuxième édition refondue, Nouvelle Clio. L'histoire et ses problèmes*. Paris.
- Vanschoonwinkel J. (1990) Animal Representations in Thera and Other Aegean Arts. In D. A. Hardy (ed.), *Thera and the Aegean World III*, 252–266. London.
- Varias García C. (1994) Algunas consideraciones en torno a las tablillas textiles (serie Oe) de Micenas. In *Actas del VIII Congreso Español de Estudios Clásicos (Madrid, 1991)*, vol. I, 315–322. Madrid.
- Varias García C. (2012) The Textile Industry in the Argolid in the Late Bronze Age from the Written Sources. In R. Laffineur and M.-L. Nosch (eds), *KOSMOS. Jewellery, Adornment and Textiles in the Aegean Bronze Age. Proceedings of the 13th International Aegean Conference/13e Rencontre égéenne internationale, University of Copenhagen, Danish National Research Foundation's Centre for Textile Research, 21–26 April 2010*, 155–163. Aegaeum 33. Leuven.
- Ventris M. and Chadwick J. (1956) *Documents in Mycenaean Greek*. Cambridge.
- Ventris M. and Chadwick J. (1973) *Documents in Mycenaean Greek* 2nd edn. Cambridge.
- Villard P. (1986) Un roi de Mari à Ugarit. *Ugarit Forschungen* 18, 387–412.
- Waetzoldt H. (1972) *Untersuchungen zur neusumerischen Textilindustrie*. Studi economici e tecnologici 1. Rome.
- Weilharter J. (2005) *Mykenische Opfertgaben nach Aussage der Linear B-Texte*. Vienna.
- Wilhelm G. (1988) Zu den Wollmassen in Nuzi. *ZA* 78, 276–283.
- Zaccagnini C. (1981) A Note on Nuzi Textiles. In M. A. Morrison and D. I. Owen (eds), *Studies on the Civilization and Culture of Nuzi and the Hurrians. In Honor of Ernest R. Lacheman on his*

Seventy-Fifth Birthday, April 29, 1981, 349–362. Winona Lake.
 Zaccagnini C. (1990) The Nuzi Wool Measures Once Again. *OrNS* 59, 312–319.
 Zurbach J. (2006) Les vases inscrits en linéaire B: essai d'interprétation globale. *AM* 121, 13–71.

1 I would like to thank L. Godart for allowing me to reproduce his drawings of Linear B tablets, as well as J.-P. Olivier for his permission to use the map of the Knossos palace with the findspots of the tablets. P. Darcque kindly allowed me to reproduce his maps as Figs 18.1, 18.2 and 18.11. M. E. Alberti, P. Darcque, M. Del Freo and J. P. Vita agreed to read, and considerably improved an earlier version of this paper. R. Firth corrected the English and discussed with me different aspects of this paper. Of course any remaining mistakes would be my own responsibility. For editorial reasons, words and syllables usually dotted in tablet transcriptions, in order to indicate that the reading is not completely certain, are here double-underlined.

2 Linear B tablets exist in two main formats: palm leaf shaped tablets are of elongated form, wider than their height, and include less than 5 lines of text; they usually record, for example, a flock, a land plot, a single transaction, etc. Page shaped tablets are longer, often summary documents, including more than five line of text. Nodules are small lumps of clay with three sides, one of which bears the imprint of a seal; they can be inscribed on one or more sides, the logogram being usually written over the seal impression. Labels are small plaques of clay with a few lines inscribed; they are characterised by the imprint of basketry on the verso, most probably from the baskets where tablets were stored (for a picture of the verso of a label, see Chadwick 1976, 19, fig. 10).

3 On the inscribed vases, see the synthesis by Zurbach 2006, with bibliography; Sacconi 2012.

4 These include for example a stone with three signs found at Dimini in Northern Greece, and an ivory seal from a tomb in Medeon (Phocid). Inscriptions on objects other than vases are quite rare in the Mycenaean period, unlike in Minoan times.

5 On the Iklaia find, see Petrakos 2010, Shelmerdine 2012. For the location of the site, see Fig. 18.1.

6 The find is dated to LH III A2. Therefore, it is earlier than the documentation preserved by the final destruction at Pylos. It might represent either an administration independent of Pylos, before the rise of the palace at Ano Englianos or, less likely, an early stage of Pylian administration, in a chronological phase not documented at Pylos itself. However, according to Palaima 1988, 172, five Pylos documents might be earlier than the bulk of the archives.

7 See map Fig. 18.1.

8 Killen and Olivier 1989.

9 Classified in the Od series. Cf. Nosch 2007.

10 Knossos series Lc, Ld, Le, Ln and L. On these series, see Nosch in this volume.

11 See also *infra*, Table 18.1.

12 3 in the Cc series and 26 in the Cc series. It should be noted that some documents in both series are too damaged to be certain of the type of animals that were initially recorded on them.

13 Documents of the La series.

14 In the Oe series.

15 At Knossos, the texts found in the *Room of the Chariot Tablets* (RCT), which is the oldest deposit of Linear B texts known until now, are dated by Driessen (cf. Driessen 1990, Driessen 2000) to the Late Minoan (= LM) II period (c. 1450–1400 BC), whereas the bulk of the archives found in the same palace is dated to LM III A2 or III B (c. 1375–1325 and 1325–1190 respectively); the Mycenaean tablets found in the House of the Oil Merchant are dated to the end of the Late Helladic (= LH) III B1 period (LH III B1 = c. 1325–1250 BC), as well as the inscribed nodules unearthed in the Liagka plot in Thebes (according to the excavator, see Piteros *et al.* 1990; see however the suggestion for a later date in Andrikou *et al.* 2006). The Pylos and Thebes tablets, as well as the Mycenaean tablets found in the citadel, are mainly dated to the end of the LH III B2 period (LH III B2 = c. 1250–1200 BC); the (textile) Lg 3 tablet from Hagios Vassileios was found during a quick survey of the site, cf. Aravantinos and Vasilogamvrou 2012, 43–44. Thus its context and dating cannot be established precisely. On the dating of the different series of wool records, see *infra*, n. 126. For updated chronological tables with both high and low chronologies, see Treuil *et al.* 2008, 32–33.

16 On the Thebes evidence, see the recent study by Alberti *et al.* 2012.

17 Melena and Olivier 1991; Shelton 2002–2003; Iakovidis *et al.* 2012.

18 Del Freo 2012, 17–18. Aravantinos and Vasilogamvrou 2012.

19 See *supra*, note 15.

20 See e.g. Chadwick 1976, Robkin 1979.

21 Melena 1974, Chadwick 1976.

22 Killen 1964, 5. Olivier 1967c, 89.

23 Olivier 1967a.

- 24 Crete is the largest of all the Greek islands, but only the fifth in surface area among the Mediterranean islands, with 8,390 km², after Sicily (25,470 km²), Sardinia (24,090 km²), Cyprus (9,282 km²), and Corsica (8,722 km²). For the areas of the islands of Sicily, Sardinia, Cyprus and Corsica, see Baurain 1984, 5–6. Crete is only separated from the extremity of Peloponnesos by 100 km, and from the Cyrenaic coast by less than 170 km. For the areas of the main Mediterranean islands, see also e.g. the study by Kolodny 1966, esp. 13, table 3.
- 25 The Cn series includes 41 records, mostly but not exclusively of page shaped format, 26 of which register sheep and goat flocks; the Cc series comprises 6 tablets.
- 26 For a typical Pylos page shaped sheep tablet, see *infra*, PY Cn 40.
- 27 TH Wu 49, Wu 57, Wu 61, Wu 64, Wu 65, Wu 67, Wu 70, Wu 72, Wu 73, Wu 78, Wu 79, Wu 82, Wu 84, Wu 85, Wu 86, Wu 91, Wu 93.
- 28 Cf. Piteros *et alii* 1990, Aravantinos 1990, Killen 1992, Killen 1994, Killen 1996.
- 29 In the Thebes tablets, the total of wool amounts in the 16 tablets of the Of series is LANA 42 PA 16 or 142 kg i.e. the wool of 188+ sheep; in the 3 documents of the Oh series, LANA 5 M 1 is recorded, i.e. the wool of 20+ sheep.
- 30 TH Lf 139. On this tablet, see Nosch 2008, 196–197.
- 31 See the map of Mycenae, Fig. 18.2.
- 32 On the tablets of the Petsas House, see Shelton 2002–2003, and Iakovidis *et al.* 2012.
- 33 Shelton 2002–2003.
- 34 The quantities recorded on the Oe tablets amount to a total of LANA 442+, which means the production of 1768+ sheep. On this series, cf. Varias García 1994.
- 35 Thus earlier in date than the bulk of the Knossos tablets, see *supra*, n. 15.
- 36 In Bennett and Olivier 1973.
- 37 These finds have been dated to the LH III B1 phase by the excavator, see Piteros *et al.* 1990. Recent publications have questioned this dating and suggested a datation in the LH III B2 phase, see Andrikou *et al.* 2006, 239–240.
- 38 Aravantinos *et al.* 2005. A number of joins have been made.
- 39 Dated to LH III B1.
- 40 LH III B1.
- 41 LH III A2.
- 42 Melena and Olivier 1991 = *Tithemy*.
- 43 Iakovidis *et al.* 2012.
- 44 Aravantinos and Vasilogamvrou 2012.
- 45 Shelton 2002–2003; Del Frio 2012, 19.
- 46 On the situation with the palatial – and non-palatial – sites in the Argolid, see Darcque and Rougemont forthcoming, with arguments in favour of an ‘Ugaritic model’ to interpret the relationship between the sites of Mycenae, Tiryns and Midea.
- 47 To date, five Linear B documents have been unearthed on this site. On these documents, see Aravantinos and Vasilogamvrou 2012, Del Frio 2012.
- 48 See *supra* n. 2, on the different formats of Linear B tablets.
- 49 See e.g. KN Ce 162, already mentioned above, or C(4) 907, a totalling record with 1700 OVIS^m, 1200 OVIS^f and 500 CAP^s.
- 50 Here, 117 is the number attributed to the scribe who wrote the tablet and J1 is the indication of the findspot (cf. Olivier 1967b); for a map of the Knossos palace with the indication of the findspots of the tablets, see Fig. 18.10 (courtesy of J.-P. Olivier).
- 51 Killen 1964.
- 52 Palaima 1989, Palaima 1992.
- 53 On pigs see also Rougemont 2006.
- 54 The Mycenaean word for shepherd, *po-me*, cf. alph. Greek ποιμήν, is also attested, but mostly in records unrelated or not directly related to their professional activities, as often in Linear B texts with professional designations. The only mention of the form *po-me* on a sheep tablet, KN Dd 1376 is most probably a proper name and not a professional designation. However, on Pylos record Ae 134, the professional designation *po-me* appears in conjunction with the generic term for ‘quadrupeds’ (Myc. *qe-to-ro-po-pi*), as is also the case, in the same series, for goatherds. On shepherds at Knossos, see also Landenius Enegren 2008, 37–50.
- 55 ‘Collectors’ are individuals recorded only by their personal name, often but not systematically in the genitive case (the word ‘collector’ itself being a modern designation, not a Mycenaean title). They appear in c. 30% of sheep flock records; some of them are also associated with textile production and textile workers. On these individuals, see mainly Ventris and Chadwick 1956, 200–202, Palmer 1963, Killen 1964, Olivier 1967c, Godart 1968, Killen 1976, Killen 1983, Godart 1987, Bennet 1992, Carlier

1992, Driessen 1992, Godart 1992, Killen 1995, Olivier 1996–1997, Olivier 2001, Rougemont 2001, Rougemont 2004, Rougemont 2009 (with bibliography). There is no general agreement on the function of these individuals; the ‘collectors’ have been interpreted as tax collectors (Ventris and Chadwick 1956, 200), as owners (Palmer 1963, 164–185, Bennet 1992) and as members of an elite (Killen 1979, Killen 1983, Bennet 1992, Driessen 1992), as people benefiting from the goods registered with their names (Killen 1964, Olivier 1967c), or as ‘fermiers’ (Carlier 1992). Lastly it has been suggested that they might have been people in charge of controlling palace flocks with deficits (Rougemont forthcoming, Rougemont 2009). For detailed explanation on the problem of the ‘collectors’, with bibliography, see Rougemont 2009 (chapters 9–10).

56 On compound signs, adjuncts and ligatures, see also Ventris and Chadwick 1956, 196–197, and Ventris and Chadwick 1973, 432–433. The meaning of most of these adjuncts has been elucidated by Ventris and Chadwick 1956 and Killen 1963a.

57 For the location of the Archives Complex (rooms 7 and 8), see Fig. 18.11, map of the Pylos palace.

58 The qualification is not adapted, since wool in the Bronze Age was plucked and not shorn.

59 See *infra* and n. 63.

60 In the case of *da-mi-ni-jo*, the place-name *ku-ta-to* might have been omitted by the scribe because the individual is often associated to this locality; however, his name occurs also with the place-name *pa-i-to* and his ‘shearing’ records, even when they are well preserved, do not bear a place-name indication.

61 On the philological difficulties raised by the interpretation of this form, see Lamberterie 1992.

62 Which would be a passive participle, see Lejeune 1958, 73.

63 This is the best preserved, thus most often quoted pair of documents illustrating this fact, but other records can be paired in the same way, even though with a lesser degree of certainty due to their more damaged state of preservation, as Dv 1113 and Dk(2) 5201 (with the shepherd *ka-ta-wo*, the ‘collector’ *da-mi-ni-jo* and the place name *ku-ta-to*; the place name is not indicated on the ‘shearing’ record); or Dd 1468 and Dk(2) 1064 (sharing the personal name *a-te-i-ja-ta* and the place name *ku-ta-to*; but the figures on Dd 1468 are broken), Dv 1104 and Dk(1) 964 (sharing the personal name *da-to-ro* and the place name *su-ri-mo*); or Dv 1128 and Dk(2) 1065 (sharing the personal name *ka-da-no* and the place name *ku-ta-to*); but these last two pairs, numbers are not well preserved).

64 Killen 1964; Killen 1993.

65 The logogram LANA used as a metrogram is considered to have a value of 3 kg, see Ventris and Chadwick 1956, 203; Chadwick 1976, 102–103 (on the general weight units system, starting with the talent). On weight systems in the Aegean, see Alberti 2003, Alberti 2011b. On the weights of wool, see Petruso 1986, Parise 1991, Parise 2009, De Fidio 1998–1999, De Fidio 1999; Aravantinos and Alberti 2006 deal with weights retrieved from the Thebes excavations; on these weights and their relationship with the Linear B metrology of wool, see e.g. *op. cit.*, 294, and esp. 302–311 and table I. On sheep fleeces and wool weights in the Near East, see Waetzoldt 1972, 17–23 for Ur III, and for example Kraus 1966, Postgate 1975 for the Old Babylonian period. The weight units used for wool and their absolute value in the Nuzi texts, with which the Linear B tablets are often compared, raise specific problems and have been much debated (see Zaccagnini 1981, whose conclusions are used by Melena 1987b and De Fidio 1998–1999, but criticised by Wilhelm 1988. On these discussions see also Zaccagnini 1990). On the wool economy in Nuzi see Abrahami in this volume. For a comparative perspective between Nuzi and Linear B wool records, see Rougemont forthcoming.

66 The following section does not, of course, claim to be exhaustive.

67 On representations of *capridae*, see e.g. Vanschoonwinckel 1990, 328–329; Morgan 1988, 58–60.

68 See Betancourt 1985, pl. 6C. (HM inv. no. 2908) and p. 81. The vase comes from a disturbed funerary context and is thus dated on the basis of its exterior decoration, which suggests the MM IB-IIA period. For a good picture of this vessel, see the picture on page 73 of the catalogue of the Herakleion Museum online at <http://www.latsis-foundation.org>.

69 The following description relies heavily on the study of the wall painting by L. Morgan, see Morgan 1988, 58–59. On animals and their representations at Thera, see also Trantalidou 2000, 724–725.

70 The frescoes from the West House are dated to the LM IA period (Immerwahr 1990, catalogue number Ak no. 12, p. 187).

71 A fact confirmed by the study of bones retrieved during the Akrotiri excavations, see Trantalidou 2000, 724. L. Morgan considers the identification made by Sp. Marinatos (Marinatos 1974, 59, n. 33) of these sheep as North African Barbary sheep (*Ammotragus Lervia*) as ‘unnecessary’ (Morgan 1988).

72 Morgan 1988, 60. The author adds further considerations on the aspect of the landscape in which the animals are depicted on the wall painting and suggest that the scene refers to the spring or the summer, when the animals were taken to the upland pastures.

73 A search in the CMS volumes, or in the online database (<http://arachne.uni-koeln.de/drupal/?q=en/node/196>) with the criterion ‘Widder’, for example, give a little over 40 seals of different provenance

and date. Among the examples dated to the LBA (either by their context of deposition, or on stylistic grounds), see e.g. CMS I no. 48 (from a tomb at Mycenae), CMS I, no. 40 (from the Mycenae acropolis), CMS II 8, no. 521 (from Knossos). It should be noted here that the ram-shaped vase reproduced in Melena 1987b, 408, fig. 2, is not a Mycenaean object but an archaic Boeotian ram vase kept in Munich (*Staatliche Antikensammlungen* inv. no. VAS 6396), see Rystedt 1987, 34, fig. 6. I would like to thank V. Matoian for drawing my attention to this publication.

74 It might also be, in part, that bovids are the most easily recognisable animals on figurines, due to their characteristic horns. On Mycenaean figurines, see e.g. the recent volume edited by Schallin and Pakkanen 2009.

75 See the volume edited by Kotjabopoulou *et al.* 2003; more recently, Moody 2012, for Crete, esp. 237–240. For a comparison of archaeozoological data with the Linear B texts, see e.g. Halstead 1998–1999, Halstead 2003.

76 Trantalidou 1990, 392. Moreover Trantalidou 2000 offers for Thera in the Late Bronze Age a comparison of osteological and iconographical data. She presents for example a table of species attested in the Thera bone material (tab. 1, p. 710), which includes of course *ovis/capra* (c. 69% of the documentation). She stresses the fact (p. 711) that the wall paintings include environmental elements pertaining to the whole of the Eastern Mediterranean and not exclusively to the Cyclades. Trantalidou 2000 deals with stockraising on pages 723–725, see esp. 724–725 on ovines-caprines. However, as already mentioned, the date of the Thera evidence is earlier than the Mycenaean texts.

77 Jarman and Jarman 1968, 241–264.

78 Halstead 2003, 257.

79 See e.g. for Nichoria the graph in Sloan and Duncan 1978, 67, fig. 6.2.

80 Hamilakis and Konsolaki 2004. Halstead and Isaakidou 2004.

81 See Ventris and Chadwick 1973, 434–435; Del Frio *et al.* 2010, 349–350.

82 As indicated by Ventris and Chadwick 1956, 36, Ventris and Chadwick 1973, 434–435, Del Frio *et al.* 2010, 340, and esp. 349–350. See also Killen 1962b, 50 and 53, on the fact that the logogram has probably been taken over from Linear A.

83 L 178 («124», RCT) and L 870 (114?, I3). For the findspots, see Fig. 18.10, map of the Knossos palace.

84 On Mycenaean textile production, see Nosch in this volume.

85 On this word, see Killen 1962a and Killen 1963b.

86 For *po-ti-ni-ja-we-jo* sheep at Knossos, see DI (1) 930, 933, 943, 946, 950, 7147, 7503, 7771, 7905, 9716. At Pylos, the goddess is recorded with sheep and pigs on Cc 665. On the economic activities linked with Potnia, see e.g. Killen 1983, esp. 73–74, Boëlle 2004, esp. 92–99, Rougemont 2008. Specifically on the flocks of divinities, see Nosch 2000c. On the economics of sanctuaries, see also Weilharter 2005, Bendall 2007 and Lupack 2008.

87 See Rougemont 2008.

88 See *infra*, Fig. 18.7.

89 The adjective *po-ti-ni-ja-we-jo* is in fact not directly derived from the goddess name *po-ti-ni-ja* (which would result in a – non attested – form **po-ti-ni-ja-jo*) but from a reconstructed word, probably **po-ti-ni-ja-wo*, according to Lejeune 1971a. For more details on the philological difficulties raised by the formation of the adjective *po-ti-ni-ja-we-jo*, see Rougemont 2005, 359–360, with previous bibliography. The adjective should thus be translated as ‘belonging to the estates of Potnia’ or ‘belonging to the priest of Potnia’ (Ruijgh 1967a) or ‘belonging to the divine mistress’ (Risch 1972), according to the reconstruction chosen.

90 Od 2026, Od 8202.

91 See Killen 1962b.

92 See Killen 1962b, Beck and Beck 1978. On this word *wi-ri-za* see also Killen 1962b, esp. 48, and Killen 1996–1997, 129–130, who discusses an earlier hypothesis of Lejeune 1971b, 162–165, according to which the logogram on the Ur record would not have been LANA but MA + a qualificatory element *re*. Note also the suggestion that *wi-ri-za* might be *ῥιζα*, ‘iris root’, by Palmer 1963, 270.

93 Sheldermine 1985, 19.

94 Killen 1996–1997, 129, with reference to Firth. On this record, both the place name (*qa-ra*) and the personal name (*ku-ja-to*) preserved correspond to the data recorded on KN De 1254. Aravantinos and Vasilogamvrou 2010 also interpret in this way the mention *ri-za* which appears after *tu-we-a₂* on HV X 4, but there are spelling difficulties for the interpretation of this form, since Myc. Greek always notes the initial digamma.

95 See for example Waetzoldt 1972 for the Ur III period. Similar data are available from texts dating to the Old Babylonian period, see Michel in this volume. It is interesting to note, however, that these indications are not found at all sites nor at all times; for example, they seem to be missing from the

Ugaritic documentation, see Matoïan and Vita in this volume.

96 See Bennett *et al.*, 1989, esp. 223–224, with comments on the join.

97 The figures are broken.

98 On this document see e.g. Duhoux 1976, 91.

99 It might be interesting to compare *ku* LANA on Thebes tablets with the ligature TELA + KU, attested at Knossos on L(4) 515, L(8) 1647, L(8) 7404, as well as L 9200. On textiles, see Nosch in this volume.

100 See the suggestion by J. L. Melena in Bennett *et al.* 1989, 204.

101 See e.g. Olivier 1996–1997, 288.

102 For the join, see Bennett *et al.* 1989, 204–205.

103 J. L. Melena in Bennett *et al.* 1989, 204. Olivier 1996–1997, 285 and n. 69.

104 It is interesting to note that clothing items of Cypriote type or style are recorded in Middle Assyrian documents, which are roughly contemporary with the Mycenaean texts, see Postgate in this volume.

105 On red colouring, see Nosch 2004; on the terminology of colours in textile records, see also Del Frio and Rougemont 2012, on which this short synthesis relies heavily. On dyes see also Nosch 2008, 197–200.

106 KN Ld(1) 573, 585, 649, Ld(2) 785. Cf. ἐρυθρός. On the Ld (1) set, see Killen 1979. On this particular colour, see also Nosch 2004.

107 KN Ld(1) 575. Cf. class. Greek σιάρκαδος? Cf. also Melena 1987a, esp. 225–226.

108 KN Ln 1568. Cf. class. Greek φοινίκιος. On this document, see e.g. Killen 1966, 108; Killen 1968, 637; as well as the recent study by Firth 2012.

109 Also on KN Ln 1568. Cf. class. Greek πορφύρεος. On purple as a dye in the archaeological record, see e.g. Alberti 2006, Alberti 2008, with bibliography.

110 KN L 5561 + X 5656. Nosch 2004, 35, suggests that the term might refer to the natural colour of the wool.

111 KN Ld(1) 587. Cf. class. Greek πολίος.

112 KN L 564, 590, 9003, 9670, Ld(1) 579, 584, 587, 598, 5845, Ld(2) 785. Cf. Greek ποικίλος. For a detailed study of textiles, see Nosch in this volume.

113 On alum, see Toti 1996, Perna 2005, Firth 2007. See also Chadwick 1964, 20–22, and Killen 1999. On exchanges in Linear B texts, see Olivier 1996–1997, Palaima 1991; see also Rougemont 2009, 171–209.

114 It is interesting to note that different suggestions have been made in the *apparatus* of this tablet in

Melena and Olivier 1991, including the hypothetic reading [TELA + [•] 400] under an erasure, suggested by J. P. Olivier, see Melena and Olivier 1991, 30.

115 PY Ab 578, Ad 694. See also the word *pe-ko-to*, on a number of textile records, which might also relate to the verb πέκω, ‘to comb’ (in the Knossos Lc series).

116 KN Ak(1) 5009.C, Lc(1) 531.B; PY Aa 89, 240; TH Of 34.2. Cf. class. Greek ἡλακάτη, ‘spindle’.

117 PY Ad 684.

118 PY Un 1322.4.

119 PY Ae 574, -765; MY Oe 130; TH Oh 208.1 (cf. aussi KN L 520.1: *do-ti-ja* LANA 18 *pe-re-ke* *164 3), cf. Class. Greek πλέκω, ‘to plait’, ‘to interlace’, ‘to weave’.

120 On these, see Nosch in this volume.

121 KN Ai 739, Ak(3) 7001; PY Aa 85, 717, Fn 187, Un 219; MY Fo 101, Oe 119 (*a-ke-ti-ri-ja*), PY Aa 815, Ab 564, 1099, Ad 290, 666, TH Of 26.1.2 (*a-ke-ti-ra*), KN Ap 694, E 777 v., Ln 1568 *lat. inf.*, M 683, Xe 544, 657, X 7737 (*a-ze-ti-ri-ja*).

122 Plural form of κναφεός, ‘fuller’. Cf. PY Cn 1287.2, En 74.3.23, Eo 160.3, 269.B, 276.2; MY Oe 119.2, 129, Oi 701.5, 704.2; TH Av 106.5.

123 Cf. KN Od 485, 486, 487. On the Od series, see Nosch 2007.

124 See Ventris and Chadwick 1973, 398, Ruijgh 1967b, 276.

125 On this terminology, see Del Frio *et al.* 2010, esp. 344–345.

126 Wool records are preserved at Knossos, Thebes, and Mycenae, in deposits from different periods. The Mycenaean Oe records were found in a LH III B1 context (thus dated between 1300–1225 BC). The Thebes Of tablets are dated to the end of LH III B2, just as the Oh series from Pelopidou street (c. 1225–1200 BC). The Knossos Od tablets have been written by different scribes and come from different findspots. According to the state of the documentations reflected in *KT V*, 21 Od tablets are attributed to Hand 103, who deals also with textiles; 5 tablets are from Hand 115 and the other texts are not attributed to a particular hand, due mainly to their fragmentary state. Thus, they belong to the bulk of the Knossos archives, dated to the LH IIIA2 or IIIB period. A number of Od tablets and fragments have been reclassified in other series and new groupings inside the Od series have been suggested by Nosch 2007.

127 Trade in general is an activity hardly documented in Linear B texts. On this problem, see Palaima

1991; Olivier 1996–1997; Rougemont 2009, 171–209; Alberti 2011a. It is interesting to note, however, that Near Eastern written sources of different times include some references to exchange with the Aegean; this is the case of the Mari texts (at the time of Linear A administration, in the 18th century BC), cf. ARMT 23, 556, about an encounter with Cretan merchants during the reign of Zimri-Lim. On this subject, also e.g. Villard 1986 (*editio princeps* of the text), Bonnet 1995, Durand 1999. Mari texts also include reference to Cretan weapons (ARMT 23, 104) and Cretan style shoes (ARM 21, 342). For cuneiform texts dated to the same time as the Linear B tablets, the well-known Ugarit text RS. 16.238 + RS 16.254, dealing with a merchant travelling to Crete should be mentioned here (see Lackenbacher 2002, 310, with translation).

128 On the geography of Mycenaean Boeotia according to the Thebes tablets, see Aravantinos 2008 [2010], Del Frio 2009.

129 On this text see Rougemont 2009, 199. On flax and linen textiles, see Rougemont 2007.

130 For transactions between individuals in the Wm series, see Wm 1707. On the Wm series, see Killen 2002–2003.

131 Nosch 2007, 65.

132 Varias Garcia 2012.

133 On the House of the Oil Merchant, see Tournavitou 1995.

134 Melena 1987b.

135 Richard Firth, personal communication (June 2013).

136 On the *pa-ro* formulae, see Killen 1979, Thompson (2000–2001 [2002]), 408–428. See also Rougemont 2009, 262–263. Cf. also *infra*, on wool allocations to workshops.

137 See the Thebes Of and Oh series, Knossos Od, Mycenae Oe series.

138 See e.g. Killen 1968, Killen 1974, Nosch 2000b, Nosch 2001, Del Frio and Rougemont 2012.

139 See e.g. Killen 1999; Perna 2004, e.g. 9–10; Rougemont forthcoming.

140 On *ta-ra-si-ja*, see for example Killen 1974; Duhoux 1976; Killen 2001; Nosch 1997–2000 [2001]; Nosch 2000a; Andersson and Nosch 2003; Nosch 2006 (non-exhaustive list). This topic is dealt with in detail by M.-L. Nosch in this volume.

141 For a detailed overview of these stages, see Del Frio and Rougemont 2012; Rougemont 2007–2008 [2010]; Del Frio *et al.* 2010.

142 The signs indicated between double brackets $\llbracket$ PA 1 $\rrbracket$ were erased by the scribe. It corresponds to 1 kg of wool.

143 Del Frio and Rougemont 2012, §10.

144 See Killen 1968. The same formula *o-pi* + personal name is also used without mention of someone delivering the wool, e.g. Od(1) 529: *o-pi ti-mu-nu-we* LANA 2[, “at **ti-mu-nu*, 6+ kg of wool”. It might also correspond to wool stored at the places recorded, but the small quantities would fit better with allocations for work.

145 Probably the same individual as on Le 641, also from scribe 103, see Landenius Enegren 2008, 62–63.

146 On the names of the ‘house’ in Classical (and Mycenaean) Greek, see mainly Knox 1970, Lejeune 1976, Le Feuvre 1997, Del Frio and Rougemont 2012, §11.

147 See Del Frio and Rougemont 2012, §11. Traces of such structures might be found at Mycenae in wool records where the allocations are made to people according to kinship links, cf. Oe 106.2, ‘to the daughter’; Oe 112.2, ‘to the daughters’. On the Thebes Of tablets, see e.g. Spyropoulos and Chadwick 1975, Nosch 2009, Del Frio and Rougemont 2012.

148 KN As(2) 1519.

149 J. Chadwick suggested that the *oikos* of Potnia was located in a place south of Thebes (Classical Potniai), cf. Spyropoulos and Chadwick 1975, 89.

150 LANA for *a-to-po-go* (for bakers) on MY Oe 117, *ka-ke-wi* (for a bronzesmith) on MY Oe 121.2, *ke-ra-me-wi* (for a potter) on Oe 125.

151 Cf. Rougemont forthcoming.

152 Cf. *supra*, section 1 and nn. 15 and 20.

153 For the comparison between Minoan and Mycenaean textile production, see e.g. Alberti 2007, Militello 2007.

19. Mycenaean Wool Economies in the Latter Part of the 2nd Millennium BC Aegean

Marie-Louise Nosch

The 2nd millennium BC Aegean witnesses the emergence of a highly specialised system of wool economy: the Late Bronze Age Mycenaean centralized palace economies with their constant recording of flocks, herders, wool, and textiles production. This system monitors production targets and surplus production, and with directional flows and production strategies ensures that the palace society's needs are met. Wool production, as attested at Knossos, is the largest sector of the palace administration and it employs the highest number of people, organized according to a strict division of labour. It is entirely focused on wool for textile production. Other secondary products, such as milk, skins, horn, lanolin, and meat certainly did play a role as well but they only occur sporadically in the palace records. Wool was major resource for the Mycenaean palace economies, especially at Knossos, while also flax seems to have played a significant role at Pylos.

Regrettably, textiles, as other organic remains, are not often preserved in the Aegean.² At Akrotiri, Thera, c. 50 fragments of wool thread and at Chania in Crete, a tiny carbonized textile ribbon most probably combining nettle, linen, and goat hair were recovered.³

Experimental archaeology has demonstrated how time-consuming Bronze Age textile production was.⁴ It could have taken several months to make a textile, depending on the desired size and quality. In the Bronze Age, it can be safely assumed that most of the population, adults or children, elite or poor, were involved in various parts of the textile production, on a day-to-day basis. The sheep had to be tended and pastured, wool had to be sorted and combed, thread spun, textiles woven, sewn, and mended. This highly time-consuming nature is one of the reasons why textile production seems so important to register and administer from the point of view of the Mycenaean palaces.



Fig. 19.1. Logogram LANA

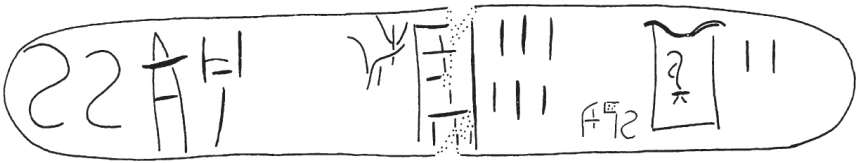


Fig. 19.2. L 178

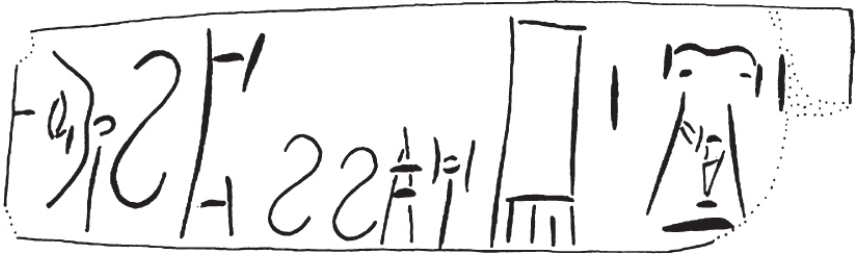


Fig. 19.3. L 870

1. The Linear B documentation

The written evidence about the Mycenaean wool economy comes primarily from Knossos, and to a lesser degree from Thebes⁵ and Mycenae;⁶ Pylos records provide rich information about wool textile workers; the other Mycenaean documents from Tiryns, Midea, and Agios Vassileios have yielded only little or no textual evidence on sheep, shepherds, textile workers, textiles or wool. The available evidence is

fragmented, unevenly preserved and, by its nature, evidently only informs us about the production in which the palace scribes had a professional interest. On the other hand, it is surprising how much evidence about the Mycenaean palace-controlled wool economy in the Late Bronze Age is preserved, and how much is known about it today.

2. Wool in the Aegean Bronze Age

In Linear B, wool is designated by the logogram **145*, conventionally transcribed by the Latin word LANA (Figure 19.1).⁷

The word for ‘wool’ is not attested itself, only through its adjective *we-we-e-a/ werweheha/* meaning ‘woollen’, related to Gr. εἶπος, in KN L 178 and L 870.

KN L 178 + 281 (Figure 19.2) (RCT/"124")
 we-we-e-a '*161' TELA³+PA 6 / u-po-we TUN+RI 2

6 woollen textiles of the type pa-we-a *161; underwear, 2 linen tunics.

KN L 870 + fr. (Figure 19.3) (I3/114?)
 o-]d̥q-ku-we-ta / we-we-e-a TELA³ 1 TUN+KI 1

The two tablets are both from Knossos but stem from two different phases, Late Minoan II (1425–1390 BC) of the Rooms of the Chariot Tablets, and Late Minoan III A2 or III B (see below).⁸

The wool logogram is also used as a metrogram, i.e. to indicate a quantity, and the weight value of this basic wool unit is 3 kg. The wool comes primarily from palace sheep flocks composed of wethers;⁹ the palace expected 1 unit of wool (3 kg) from 4 adult castrated sheep, i.e. around 750 g per animal. There are also records of breeding flocks composed of ewes and their lambs, and their wool target is only 10 animals: 1 unit of wool, i.e. c. 300 g per animal. This demonstrates a quantitative – and probably qualitative – difference between wool from wethers and wool from ewes and/or lambs. This difference becomes apparent on a tablet from Mycenae, Oe 111, which registers separately wool from sheep, *o-u-ka/ owika/*, and wool from lambs, *wo-ro-ne-ja/wroneia/* (cf. ὄις and ἀρήν).¹⁰ Scribe 51 also seems to distinguish between new wool (*ne-wa*) and wool from the previous year (*pe-ru-si-nwa*) on Oe 111.

3. The nature of Mycenaean raw wool

Raw wool consists of hair, kemp, and under-wool on the sheep. Textiles can be made of many types of hair and wool – sheep, camel, goat, dog, or rabbit. However, in the Mediterranean Bronze Age records, we encounter, first and foremost, a highly intensive exploitation of sheep wool and a comprehensive management system of this exploitation.

A fleece is, in English, both the term for the dead animal's skin and wool, and also for the wool taken (plucked) from a sheep. In this paper I employ the term fleece in this latter sense. The fleece is in classical Greek πόκος and this is probably also found in Linear B in *po-ka*:

KN Dp 997 + 7206 (I3/118)
 .a]po-ti-ni-ja-we-ja [
 .b]to-sa , / ne-wa , po-ka OVIS^f [

so many: new fleeces of/belonging to the Potnia, ewes (numbers broken)

These fleeces are associated with the major Mycenaean female divinity, Potnia, ‘the mistress’, and *po-ti-ni-ja-we-ja* is an adjective build on her name. She seems to play a role in the flocks of ewes and lambs, perhaps associated with reproduction and birth of lambs in Crete.¹¹

When wool is cleaned and prepared or occurs in smaller quantities than an entire fleece, it can be termed ‘tufts of wool’, *ti-ra /tilai/*, and on a tablet from Knossos, Od(1) 681, a male textile worker called *qo-ja-te* is recorded as having delivered tufts of wool to someone.

4. The Linear B records of wool

The Mycenaean wool economy is clearly documented in the records at Knossos and was a significant part of daily life in palaces, sanctuaries, households, and farmsteads. Wool production by flocks of sheep controlled by the palace was meticulously recorded by palace scribes who calculated the possible wool yields and the ensuing textile production; some 100,000 sheep were tended by some 700 shepherds in Crete;¹² wool was allocated to groups of women and children who were commissioned to fulfil certain textile production targets; wool was also allocated in smaller quantities to specialised textile workers for the finishing and decoration of textiles; and wool was offered to the gods.¹³

Relative date	Deposit/archive	Wool and textile records	Absolute dates
Late Minoan II	Knossos Room of the Chariot tablets	Textile records in the L series by scribe 124	1425–1390
Late Minoan III A2 Or Late Minoan III B	Knossos main archive	Textile records in the L series and wool records in the Od series by scribes 103, 113, 115, 227; Wool yields in the Dk and Dl series recorded by scribes 118, 119, 120; textile workers in the A series by scribes 103, 108	1370–1340 / 1340–1190
Late Helladic III B	Mycenae, Petsas House	Ui 2	End 14th century
Late Helladic III B1 end	Mycenae House of the Oil Merchant	Wool tablets	1250
	Pylos	Textile workers in A series	1200
	Thebes	Wool tablets Of and Oh	1200
	Mycenae, House of Columns	L 710	1200

Table 19.1. The chronology of Linear B tablets recording wool and. textiles.

Wool is recorded on tablets found in the following palaces:

- Oh tablets recording allocations of wool to textile workers and sanctuaries.
- Oh tablets recording smaller quantities of wool.
- My tablets recording allocations of wool to textile workers, and as remuneration.¹⁴
- Kn tablets recording various transactions of wool such as allocation of wool to workers and to sanctuaries.¹⁵

5. The wool administration at Knossos

Knossos Od wool tablets are divided into several sets, each associated with a specific scribe and a particular scope.¹⁶

5.1. Totalling records of large quantities of wool at Knossos

Two tablets record extraordinarily large quantities of wool: 700 units of wool equal to 2,100 kg, or wool from 2,800 sheep. These two tablets are unusual

because of the large quantities and because of their connection to the sign *PE* which is probably an abbreviation of a term qualifying the wool.

KN Od(3) 1062 + fr. (-)
LANA PE 200 [

KN Od(3) 1063 (-)
]LANA PE 500

5.2. Wool in smaller quantities for finishing textiles at Knossos

Other tablets record smaller quantities of wool for finishing purposes, especially those recorded by scribe 115 and scribe 103.¹⁷ All these are found in the West Wing of the palace where they had fallen from the first floor when the West Wing collapsed.¹⁸ They record many kinds of wool transactions pertaining to the textile qualities *pa-we-a*, *te-pa*, *tu-na-no*, *pe-ko-to*.

KN Od(1) 539 + 7296 + 7602 (103/F10)
o-pi ti-mu-nu-we LANA 2[

In the workshop of *ti-mu-nu*, 2 units of wool

5.3. Wool for a goddess in Knossos

Four tablets are also by scribe 103, but differ in that these tablets were found slightly further to the east within the West Wing (G1) and these records evidently concern some religious purpose since they record wool for *e-re-u-ti-ja* which is the Mycenaean Greek goddess Eleuthia.

KN Od(2) 714 (103/G1)
.a a-*65-na [
.b e-re-u-ti-ja LANA 1]

KN Od(2) 715 (103/G1)
.a e-re-u-ti-ja
.b ta-wa-ko-to LANA 1

KN Od(2) 716 (103/G1)
.a] e-re-u-ti-ja
.b] LANA 4

6. The wool administration at Mycenae

At Mycenae, no records of sheep or rations for textile workers are preserved but highly detailed records of wool allocations provide an insight into the wool economy. C. Varias Garcia rightly observes that, although there are only 77 Linear B inscriptions preserved from Mycenae, at least 36 of them, almost 43%, deal with the wool economy.¹⁹ Wool is allocated for the same types of fabrics as at Knossos, *te-pa*, *pa-we-a* and *pu-ka-ta-ri-ja* (L 710, Oe 107; 111; 127; X 508) within the production and *corvée* system called *ta-ra-si-ja* which was based on the labour of women and both male and female children, and these allocations were administered by scribes 51 and 55.

MY Oe 107 NMA 13100 (51)
 .1 te-pa-i , LANA 9
 .2-3 vacat

MY Oe 127 NMA 13099 (55)
 pa-we-a₂ , e-we-pe-se-so-me-na , LANA 20

MY Oe 110 NMA 13102 (51)
 .1 re-ka-sa , ta-ra-si-ja LANA 14[
 .2 a-ti-ke-ne-ja LANA 10

C. Varias Garcia observed that the two amounts of wool on Oe 110 correspond exactly to the production of two *te-pa* by the textile worker *re-ka-sa*, and one *te-pa pe-ko-to* by the textile worker *a-ti-ke-ne-ja*.²⁰ Other allocations of wool go to textile specialists, such as female textile finishers (*a-ke-ti-ri-ja*) and male fullers which are specialised in washing and treating wool fabrics (*ka-na-pe-we*) and scribes 52 and 56 record them.

MY Oe 119 NMA 52-119 (52)
 .1 a-ke-ti-ri[
 .2 ka-na-pe[

MY Oe 129 NMA 52-129 (56)
 .a di-du-mo
 ne-wo , ka-na-pe-we LANA 4

For Didumo, the new fuller, 4 units of wool (12 kg)

Tablet Oe 111, which registers wool from lambs, *wo-ro-ne-ja/wroneia*/ (cf. *δῆς* and *ἀρήν*), and perhaps also wool from sheep, *o-u-ka /owika/* (but this interpretation has morphological problems), seems to be some kind of total delivery record.

MY Oe 111 + 136 NMA 52-111 + 136 (51)
 .1 pe-ru-si-nwa , o-u-ka[
 .2 wo-ro-ne-ja , pa-we-si / [•]-me-`jo-i' LANA[
 .3 ne[-wa]o-u-ka LANA[
 .4]-ki-ni-*56 LANA 100[
 .5] o-ta-pa-ro-te-wa-ro LANA 200[
 .6] vacat

The quantities of wool are considerable: the numbers are broken on the three first lines but at least 300 units of wool, i.e. 900 kg are preserved on the two last lines. The wool is *pa-we-si*, for *pa-we-a* textiles, and from 300 units could be made 180 *pa-we-a*.

On another tablet from Mycenae, Ui 2, there may perhaps be a record of the status of two large wool deliveries (*a-pu-do-si*), one earlier (*po-ro-te-ra*, *πρότερα*), and the other later (*o-u-te-ra*, *ὥ ὑστερα*²¹). In conclusion, the Mycenae wool economy and administration seem to have been based on the same model as the Knossos wool economy and administration.

7. The Of and Oh wool tablets in Thebes

In Thebes, 16 tablets recording wool have been found. These Of tablets are primarily attributed to scribe 303. In the 1990s, a further 3 Oh tablets came to light in another Theban excavation but with a similar content. From the occupational designation *te-pe-ja*, 'te-pa makers' on Of 35, we know that at Thebes, too, woollen *te-pa* were made. These Thebes wool record tablets have many similarities with those from Knossos: at Thebes, wool is allocated to individuals, to

groups, to divinities, and to two types of ‘houses’, *do- (do-de ‘to the house’) and *woikos (wo-i-ko-de) of a divinity.²²

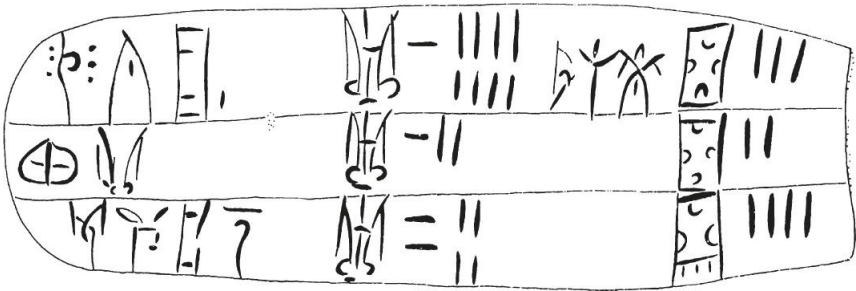


Fig 19.4. KN L 520

8. The woollen textiles in the Linear B Tablets²³

Knossos tablet L 520 (Figure 19.4) is a superb illustration of how the entire Mycenaean wool economy was based on the weight of wool and its equivalence in standard fabrics. L 520 is the meticulous record of the amounts of wool given to two villages, *do-ti-ja* and *ka-ma*, and to a ‘collector’ (see below) called *sa-mu-ta-jo*, for their manufacture of a total of nine textiles designated by the logogram *164.

KN L	520					(-)
.1	do-ti-ja ,	LANA 18	pe-re-ke	*164	3	
.2	ka-ma	LANA 12		*164	2	
.3	sa-mu-ta-jo	LANA 24		*164	4	

8.1. The Linear B textile logograms and types of woollen textiles

Most Mycenaean textiles recorded in the palace archival documents are made of wool, and they seem to be primarily recorded as rather standardised textiles that do not require cutting or tailoring. Most textiles are recorded by the logogram for textile, in Latin *TELA*. This logogram is a generic sign for textile that can be altered according to the textile type by means of an endogram, which is a syllable inside the *TELA* logogram abbreviating the specific type of textile.



Fig 19.5. TELA + TE logogram

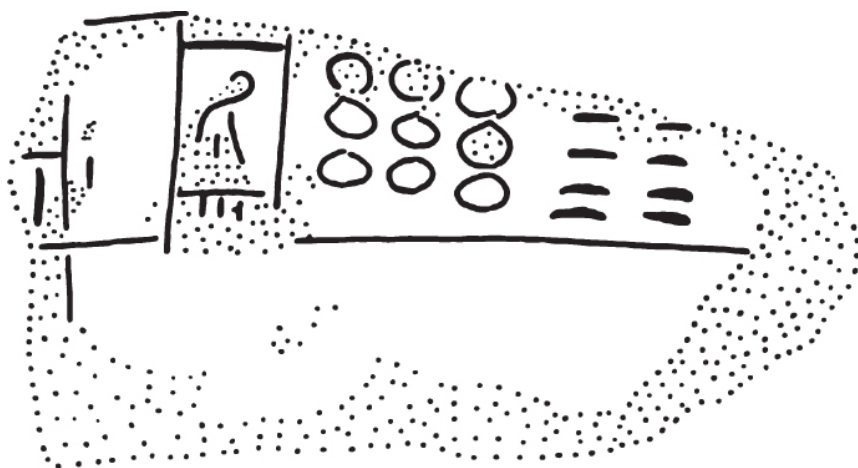


Fig. 19.6. KN L 5561

8.2. Types of Mycenaean woollen textiles

There are three primary Mycenaean textiles, *te-pa*, *pu-ka-ta-ri-ja*, and *pa-we-a*, they are attested in several palace archives, and can be subdivided into different kinds. These Mycenaean textiles are mostly in wool.

Te-pa or **TELA + TE** (Figure 19.5) is primarily attested at Knossos,²⁴ and a few at Pylos, Mycenae, and Thebes.²⁵ All *te-pa* are made of sheep wool. **TELA + TE** exists in several types: the standard **TELA + TE te-pa**; **TELA + TE pe/pe-ko-to**, and **TELA**

+ *TE mi/mi-ja-ro*. *TELA + TE* corresponds to 7 units of wool, that is, 21 kilos; the variety *TELA + TE pe-ko-to* requires 10 units of wool, i.e. 30 kg. There is generally no indication of decoration or dyes.²⁶ These fabrics are characterised by being heavy, large, and woollen.

Pu-ka-ta-ri-ja, or *TELA + PU* cloth, is exclusively attested to be made of wool. Its name may refer to a double thickness or perhaps the folded nature of the cloth.²⁷ *Pu-ka-ta-ri-ja* fabrics were, by far, the most abundant among the Knossian textiles but are also attested at Pylos and at Mycenae. Tablet L 5561 (Figure 19.6) from Knossos is probably a totalling record of *TELA + PU* textiles, and the mere number of 980 textiles demonstrates how important this woollen fabric was in the wool economy. 980 *TELA + PU* textiles required 2940 kg wool, or wool from 3920 sheep. This amount of wool can yield at least 9000 km of yarn (see below for calculations of yarn).

KN L 5561 + 5656 (-)
 .1]-ru-wa , TELA³+PU 980[
 .2]1[
 inf. mut.
 .1 Perhaps ? o-] *du-ru-wa*, but]*pu-ru-wa* not excluded and probably better.



Fig. 19.7. *TELA + PA* logogram

Type of textile	Logogram	Requirement in wool units	Equivalent in kg	Number of sheep needed for this textile
<i>pa-we-a</i>	TELA+PA	1.67	c. 5 kg	6–7
<i>Te-pa</i>	TELA+TE	7	21	28
<i>Tu-na-no</i>		3	9	12
<i>Pe-ko-to</i>	TELA+TE	10	30	40
<i>Pu-ka-ta-ri-ja</i> ²⁸	TELA+PU	1	3	4
	*164	6	18	24

Table 19.2. Mycenaean textiles and the necessary amounts of wool.

These 980 *pu-ka-ta-ri-ja* fabrics may be *pu-ru-wa* / *purwai*, ‘red’ as suggested by the reading by José Melena, and this may be the natural red-brown pigmentation of wool.²⁹ This red-brown colour may indeed be a characteristic feature for them; in any case, we find no other specification of decoration, edges, or dyes of *pu-ka-ta-ri-ja*.

Pa-we-a or variant ***pa-we-a*₂**/*pharweha* TELA+PA (Figure 19.7), in Homer φᾶρος, is one of the most well attested Mycenaean woollen fabrics at Knossos, Pylos, and Mycenae.³⁰ One piece of *pa-wo* equals 1.67 LANA units, i.e. about 5 kg raw sheep wool. The size of a *pa-wo* is probably c. 2 m², thus, a ‘wearable’ size.³¹ *pa-we-a* is recorded with many different qualifications concerning decoration and colour.³² A special feature of *pa-we-a* is that they can be made of linen (L[1] set), possibly of sheep wool, *o-u-ka/owika*/, or of lambswool (MY Oe 111).

At Knossos further wool fabrics are attested: *tu-na-no* TELA³³ is a woollen cloth type, and one *tu-na-no* required 3 units of wool (= 9 kg).³⁴ *to-mi-ka* TELA is another woollen cloth type with an unknown etymology.³⁵ *164³⁶ is a woollen cloth, too, and we do not know its Mycenaean name, but one piece of *164 required 6 units of raw wool, i.e. 18 kg.

J. Killen was the first to identify this quantitative relationship between wool and woollen textiles in the Linear B records and it can be summarised in Table 19.2.³⁷

9. Quantifying Mycenaean woollen textiles at Knossos

Table 19.3 displays a conservative estimate of the number of woollen textiles recorded at Knossos and their equivalent in wool and sheep whenever it is possible to calculate them, and restoring 1 unit of wool per textile for those textiles without any known equivalent (in *italics*).³⁸ With a total of approximately 100,000 sheep in Crete,³⁹ these wool figures do not seem excessive.

Cloth types	Knossos	Number of sheep	Number of wool units	Amount of wool in kg
TELA+KU	48+	192+	48+	144+
TELA+PU	2545+	10,180+	2545+	7635+
*168+SE	247	988	247	741
*164	10+	240	60	180
<i>to-mi-ka</i> TELA	215/251	860	215	645
TELA+TE	281/381	10,668	2667	8001
TELA+PA	950	6179	1545	4635
<i>tu-na-no</i> TELA	63	756	189	567
TELA+TE <i>pe-ko-to</i>	20	800	200	600
Total		30,743	7686	23,058

Table 19.3. Woollen textiles at Knossos.

Type of textile	Estimate of amount of clean wool in kg ³⁸	Length of thread spun on 18 g spindle whorl ³⁹	Spinning time	M ² of cloth with 10 threads/cm ²
<i>pa-we-a</i>	2.5	15 km	300 h	7.5 m ²
<i>te-pa</i>	10.5	63 km	1260 h	31.5 m ²
<i>tu-na-no</i>	4.5	27 km	540 h	13.5 m ²
<i>te-pa pe-ko-to</i>	15	90 km	1800 h	45 m ²
<i>pu-ka-ta-ri-ja</i>	1.5	9 km	180 h	4.5 m ²
*164	9	54 km	1080 h	27 m ²

Table 19.4. Yields of yarn.

9.1 Quantifying Mycenaean textiles: thread, time, and fabrics

Mycenaean woollen textiles are characterised by the rather large quantities of fibre required for their fabrication.⁴² These quantities can be elucidated and combined with experimental archaeology (Table 19.4).⁴³

It seems that the Linear B records contain textiles which relate to special palace or commercial needs, rather than textiles for the everyday clothing of a Bronze Age family. The large quantities of wool per textile in Mycenaean records have parallels in the Near Eastern documentation, but the extremely large quantities such as 21 kilos for a *te-pa* or 30 kilos for a *te-pa pe-ko-to* are quite surprising and may represent a special Mycenaean feature.

10. Geographical and administrative organisation of the wool economy in Crete

At Knossos, production targets were set for the textile production each year. The targets and estimates were probably set based on data from the previous year's record, and the scribe estimated how much wool would be needed for the targeted textile production. The Knossian administration produced separate targets for villages in central Crete in the Lc(1) set, and targets for the villages in western Crete were produced by another scribe in the Lc(2) set.⁴⁴ This administrative division of Crete firmly shaped the concept of space in the minds of the Knossian administrators and scribes.⁴⁵ Three examples illustrate the production targets for woollen textiles for women of the central Cretan places *qa-mo*, *dawo*, and *ku-do-ni-ja*, modern-day Khania in western Crete.

KN Lc(1) 543 (103)
.A TELA¹+TE 11[
.B qa-mi-ja / tu[-na-no

Women at *qa-mo*, 11 pieces of *te-pa* ; x [numbers broken] pieces of *tu-na-no*

Eleven *te-pa* textiles required 77 units of wool = 231 kg of wool. This means wool from 308 sheep, and we know from other records that there were 656 sheep recorded near the village of *qa-mo*.⁴⁶

KN Lc(1) 526 (103)
.A] `pe-ko-to' TELA¹+TE 10 TELA²+TE 14[
.B]da-wi-ja / tu-na-no TELA¹ 3 LANA[

Women at *da-wo*, 10 pieces of *te-pa pe-ko-to*; 14 pieces of (regular) *te-pa*; 3 pieces of *tu-na-no*, and wool (numbers broken).

Ten *te-pa pe-ko-to* textiles required 100 units of wool; fourteen regular *te-pa* textiles required 98 units of wool; 3 *tu-na-no* textiles required 9 units of wool = 207 units

of wool, or 621 kg. This means wool from 828 sheep. At *Da-wo* we have a total record of 2,440 sheep.⁴⁷

KN Lc(2) 481 (113)

.A] `pa-we-a' TELA³ 30[
 .B] , ku-do-ni-ja LANA[

↓ (115)

v. to-]u-ka LANA[
 .B Trace of majuscule sign at left, perhaps]jφ.

Thirty *pa-we-a* textiles required 50 units of raw wool = 150 kg. This means wool from 200 sheep. The note by the editors suggesting the reading]jφ at the beginning of the tablet points towards an interpretation of this target as a production target for a collector since -jo is a common ending of a personal male name in the nominative or the genitive form. 'Collectors' is the designation given by modern scholars to a highly debated administrative entity in the Mycenaean palace records appearing in the form of men's names, often in the genitive form. The level of responsibility, power or influence held by these men is unknown, but they appear in approximately 30% of the records pertaining to textile workers, sheep, textile production, landholdings, and metallurgy; the 'collectors' exist in all Mycenaean palace administrations.

An example of the collectors' involvement in the Knossos wool economy is the L(3) set which records the textile type *TELA* + *PU*, i.e. the *pu-ka-ta-ri-ja* textile. They contain information about Cretan villages and their missing deliveries of *TELA* + *PU* to the palace.

KN L(3) 473 + 8026 (207)

.A o-pe-ro `pe' TELA²+PU 38
 .B qa-ra / i-se-we-ri-jo

KN L(3) 869 (207)

.A o-pe-ro `pe' TELA²+PU 3
 .B ti-ri-to / pi[] vac.

o-pe-ro pe is the abbreviated expression for *o-pe-ro pe-ru-si-nwa*, 'missing from previous year'. Thus, this is the result of the targets which have not been fulfilled, and the scribe keeps track of this. *i-se-we-ri-jo* is the name of a Knossian 'collector', and it is therefore plausible that he is responsible for the transaction, either because he did not make the people of *qa-ra* deliver their textiles, or because he is now assigned to taking up the case and ensuring the delivery of the missing textiles. A similar situation is recorded on L(3) 869 at *ti-ri-to* where 3 *pu-ka-ta-ri-ja* textiles are missing and the collector pi[is responsible, or held responsible, for the deficit.

Woollen *pu-ka-ta-ri-ja*/ *TELA* + *PU* textiles are also recorded by scribe 214 and he gathers information about their sizes and qualities (Figure 19.8).

KN L(10) 735 (214)

.1]a-ro₂-e TELA³+PU [
 .2] me-sa-ta , TELA^x+PU[

KN L(10) 7409 + 8304 (214?)

.A] a-ro₂-e TELA³+PU 60[
 .B to-]sa / me-sa-ta TELA³ +PU 100 [
lat. inf.] to-sa TELA[

The *pu-ka-ta-ri-ja* textiles are qualified as *me-sa-ta* / *messatai*, denoting 'medium sized', and *a-ro-a* / *aryoha*, meaning 'of better quality'.



Fig. 19.8. KN L(10) 7409.

10.1 The *ta-ra-si-ja* wool textile production system

The *ta-ra-si-ja* textile production system was a system of obligatory wool work placed on village women and – for a lesser part – placed on collectors and their textile workers. It is debated whether the *ta-ra-si-ja* textile obligation governed all types of textile manufacture,⁴⁸ or whether it was an obligation restricted to the production of certain types of textiles (*pa-we-a*, *tu-na-no*, *TELA* + *TE*, *pe-ko-to*).⁴⁹ In any case, other modes of procurement, such as the fiscal system, were also employed to acquire textiles.⁵⁰ The *ta-ra-si-ja* obligation also existed for smiths and for chariot manufacture at Knossos.⁵¹

The basic principle of the *ta-ra-si-ja* textile obligations was that specialised workers (primarily female) were allocated raw wool in specific quantities, which were to be transformed into finished woollen fabrics of a predefined type. Since the totalling records of the *ta-ra-si-ja* production for one year are preserved,⁵² we know the annual volume of the *ta-ra-si-ja* textile obligation in terms of wool quantities and in terms of the workload for textile workers in Cretan villages (Lc[1] 536) and for the textile workers under a ‘a collector’ (Lc[1] 535).

KN Lc(1) 535 + 538 (103)
 .A ta-ra-si-ja pa-we-a [
 .B ke-ri-mi-ja tu-na-no [
 .C to-sa / pe-ko-to [
 .C Trace at right consistent with TELA[.

KN Lc(1) 536 [+] 7383 + 7731 (103)
 .A] ta-ra-si[-ja]pa-we-a[]TELA^x 200
 .B] vest.[] tu-na-no[]TELA¹ 48 a-ro-zo `ki-to` TELA¹ 1
 .C to-]sa / pe[-ko-to TELA¹+TE]18 TELA¹+TE 267

The total of *ta-ra-si-ja* textile obligations corresponds to the production of approximately a dozen Cretan villages.⁵³ Thus, *ta-ra-si-ja* is a compulsory obligation of wool work mandatory for about one third of the 31 Cretan villages attested in the sheep records Da-Dg.⁵⁴ It seems plausible that the extent of the obligation varied from year to year according to the textile needs of the palace economy.

At Pylos, too, *ta-ra-si-ja* may be recorded with textile production, in particular *te-pa*/TELA + TE, which is also an important textile type of the Knossian *ta-ra-si-ja*.

PY La 1393 (13)
 .1]sq-to , a-ri-wo , ta-ra-
 .2]TELA^x+TE 40 [

10.2 The wool textile scribes

Scribe 207 records the woollen textiles called *pu-ka-ta-ri-ja*, and other scribes deal with other types of textiles, such as *to-mi-ka*.⁵⁵ Thus, these are highly specialised scribes; they were not necessarily only occupied with this task of recording a particular type of fabric, but clearly they rarely shared their assignment with others. The only Knossos scribe who collaborated systematically with other scribes is scribe 103, the most prolific Knossian scribe in the wool economy in terms of textile administration because he is the one responsible for recording most of the Knossian-controlled woollen textile production, in particular the *ta-ra-si-ja* production. His collaborators were scribes 115 (primarily recording smaller amounts of wool for finishing textiles) and scribe 113 (recording wool for textile targets in west Cretan villages):

KN Od 487 (115)
 .a]to LANA M 1 [
 .b]-ka LANA 2 [

Scribe 115's role in the administration is embedded within the bureaucracy to a degree that he was also present when the targets for the following year's textile production in western Crete were set by scribe 113 and the necessary wool quantities estimated, measured and allocated in the same administrative files, and on the back of these tablets, scribe 115 notes how much wool eventually will be necessary for the finishing and decoration when the textiles were ready: 56

KN Lc(2) 581 (113)
 .A] `pa-we-a` TELA⁺ 40[
 .B]no , / ko-u-re-ja LANA 30[
 ↓ (115)
 v.] to-u-ka LANA[

Front side of tablet, written by scribe 113:

]no (probably the end of the name of a collector or of a place name), female makers of (*pa-we-a*) *ko-u-ra* textile, 30 (or more) units of wool, for 40 (or more) pieces of *pa-we-a* textiles

Reverse of tablet, written by scribe 115:

For the finishing (*to-u-ka*), so much wool (numbers broken)

Scribe 113 registered the production target for a group of women known to produce *pa-we-a ko-u-ra* cloth: together they had to produce 40 pieces of *pa-we-a ko-u-ra* and, for this purpose they needed 30 units of wool. This amount equals 90 kg of wool. The wool is measured but probably not actually distributed *in natura* from the Knossos palace stores to this unidentified place in western Crete.⁵⁷ It seems more practical and plausible that the women would receive the wool directly from the palace-controlled sheep already present near their village.

10.3. Incoming woollen textiles: receipts and storage records in the Ld and Le series

Textiles are valuable products; if well maintained, they do not lose their value over time, if they are taken care of and protected against insects and humidity. As such, they represent a staple good in pre-monetary societies parallel to metals.

At Knossos, it is again scribe 103 who records the incoming *te-pa* textiles, their origin, producers, and their number. On tablet Le 642, scribe 103 records that these woollen textiles are delivered to the palace within the framework of the *ta-*

ra-si-ja system: the deliveries of *te-pa* from groups of women under direct palace control (such as the *ri-jo-no* women), or groups of women under a collector (such as *da-mo-ko[-ro]*).

KN Le 642 + 5950 (103)

- .1]ra-wo , de-ko-to `t̥a-ra-si-ja' ne[
- .2]ja TELA⁺+TE 2 ri-jo-ni-ja TELA⁺+TE[
- .3]ri-jo TELA⁺+TE 6 da-mo-ko[
- .4] vacat [

]ra-wo has received (within the framework of) *ta-ra-si-ja*, this years⁸

The women of?, 2 *te-pa*; the women from *ri-jo-no*, x (number broken) *te-pa*

The man / collector]ri-jo, 6 *te-pa*; the man *da-mo-ko*[ro, x (number broken) *te-pa*

We are fortunate to have the individual targets for many of these groups (series Lc, see above) in which their *te-pa* targets are set in quite large numbers, and this indicates that Le 642 and Le 654 below only list some of the *te-pa* textiles delivered, it is a preliminary inventory but not yet the fulfilment of the textile obligations.

Although the textile logogram is not preserved on this tablet, the scribe, the findspot and the place names demonstrate that the tablet recorded is *te-pa*/TELA +TE. The producers are groups of women under direct palace control (Amnisos women, *Se-to-i-ja* women, *Tu-ni-ja* women), or groups of women supervised by the collector called *we-we-si-jo*.

KN Le 654 (103)

- .1 *sup. mut.*
- .2]s̥i-ja [
- .3 a-mi-ni-si-ja [
- .4 se-to-i-ja `wa' 2[
- .5 tu-ni-ja 2[
- .6 we-we-si-jo 1[

In line 4 were recorded *te-pa* cloth qualified as *wa*, which is an abbreviation of *wa-na-ka-te-ra*, royal, and this refers to the delivery of specific *te-pa* fabrics at *se-to-i-ja* which are recorded for a target on another tablet:

KN Lc(1) 525 (103)

- .a 'wa-na-ka-te-ra' TELA⁺+TE 40 LANA 100 [
- .b se-to-i-ja , / tu-na-no TELA⁺ 3 LANA [

At *se-to-i-ja*: 3 *tu-na-no* (equivalent of 9 units of) wool, 40 royal *te-pa*, 100 units of wool.

Other tablets record the delivery and storage of woollen *pa-we-a* textiles.⁵⁹ The Ld(1) set is by scribe 116, and was found in F14 (which is also the place where many of scribe 103's tablets were found). Some Ld(1) tablets record deliveries,⁶⁰ others the storage⁶¹ of textiles. An example is the delivery record from a collector on Ld(1) 598:

KN Ld(1) 598 + 661 (116)

- .1 wi-jo-qo-ta-o po-ki-ro-nu-ka TELA 1 [
- .2 re-u-ko-nu-ka TELA⁺ 37 ko-ro-ta₂ TELA 2 [

lat. inf. to-sa TELA 40 o TELA⁺ 6[

Front Side

From *wi-jo-qo-ta*: 1 textile with variegated edges; 37 textiles with white edges; 2 dyed textiles.

Lower edge of tablet

Total (delivery): 40 textiles, 6 textiles still missing

The collector *wi-jo-qo-ta* is involved in the Knossian textile industry, but scribe 116 states that *wi-jo-qo-ta* has only partially fulfilled his target since the delivery of 6 textiles is still outstanding.

Textile production targets were set for collectors in the Lc(1) set and totalled onto Lc(1) 535 (see above); when the finished textiles are returned to the palace, scribe 116 records each individual delivery, and eventually compiles a list of all textiles delivered from collectors (Figure 19.9):⁶²



Fig. 19.9. KN Ld(1) 587.

KN Ld(1) 587 + 589 + 596 + 8262 (116)
 .1 to-sa , po-ki-ro-nu-ka TELA² 24 re-u-ko-nu-ka TELA² 372
 .2 ko-ro-ta₂ TELA² 14 *56-ra-ku-ja TELA^{*} 42 po-ri-wa TELA² 1
 lat. inf. vac. [] to-ṣa TELA 149

Front side: Total: 24 textiles with variegated edges; 372 textiles with white edges; 14 dyed textiles;⁶³ 42 *56-*ra-ku-ja* textiles; 1 grey textile

Reverse: Total: 149 textiles

The front side lists a total of 453 *pa-we-a* which correspond to a wool expenditure of 2267 kilos of raw wool from more than 3000 sheep.

An example of a detailed storage record is Ld(1) 571:

KN Ld(1) 571 (116)
 .a pe-ne-we-ta a-ro₂-a *158 1
 .b pa-we-a , / e-qe-si-ja , re-u-ko-nu-ka , TELA³ 25

pa-we-a textiles: of the *e-qe-ta* type, with white edges, 25 pieces; 1 textile (?) of the type *158, with *pe-ne-we-ta*, of better quality.

On this storage record, the scribe also mentions receivers/consumers of the textiles: the *e-qe-ta*. These are elite members, literally ‘followers’ of the king, and one of their benefits may have been the access to textiles from the palace storeroom for their personal use. Their woollen *pa-we-a* textiles, however, are of standard type: they have white edgings just like 82% of all the fabrics delivered from collectors that year, as recorded on Ld(1) 587. All Ld(1) storage records count finished textiles as multiples of five and this suggests that woollen *pa-we-a* textiles were stored in bales of five.⁶⁴

The Ld series contains multiple, rich descriptions of textiles; the relative standardisation apparent in the earlier stages of the palace textile administration disappears in these final records: here the textiles stand out as colourful and complex, in contrast to the mere logograms used in the targets. Still, regrettably, there are many terms which remain obscure to us but their mere presence, however, demonstrates the care and interest in the various details of a textile and

the advances in terminology to grasp and define textile qualities.

11. Decoration of woollen textiles: dyes, natural pigments, other fibres, and the exploitation of natural resources

Woollen textiles are recorded in the Linear B tablets in terms of their number, decoration, and colour. Sometimes, the scribes also add information about the state of preservation of the textiles, their quality, or their size. Decoration is often expressed in terms of *-o-nu-ka*, which has been translated as ‘fringes’. However, fringes on a textile are generally the warp thread ends, i.e. the threads that are intertwined with the perpendicular weft threads; since the *o-nu-ka* part varies, it seems more plausible to suggest edges or another kind of added decoration.⁶⁵

Murex yields a colourfast dyestuff for woollen textiles; in particular, tablet X 976 records *po-pu-re-i-jo*, probably ‘royal’ (*wa-na-ke-te-ro*) purple dyers.⁶⁶ Murex as a source of purple dyestuff is a known technique in the Mediterranean area, and the archaeological contexts and findings of heaps of murex shells suggest that an intensive exploitation took place in the Bronze Age.⁶⁷ However, a more readily available, although not entirely colourfast, source of dyestuff is provided by the various plants yielding red dyestuff. Henna, madder, and alkanet are efficient plant providers of red dyestuff, and the various terms used to designate red textiles suggest that a number of sources provided the red colour.⁶⁸ Other woollen textiles were dyed yellow: the intensive cultivation of safflower, *ka-na-ko e-ru-ta-ra*, at Mycenae (the Ge series) and recordings of saffron (CROcus logogram) demonstrate a steady supply of yellow dyestuff.

Bronze Age goat hair is attested in the archaeological record on Crete.⁶⁹ Goat hair is in the Bronze Age especially valuable for ropes, as was demonstrated by Anna Michailidou.⁷⁰ Its use as rope is attested in Mesopotamia⁷¹ and all over in the ancient Near East as well as in 2nd millennium Egypt. Interestingly, rope, like wool for textiles, is measured in terms of weight, and not in terms of length. Michailidou concludes that “depending on the purpose of the rope, its length will have been of interest to its future users, but the fact that its weight is recorded points to the overriding importance of the weight, perhaps as an indication of the thickness and quality of the rope and therefore of its suitability for the use intended.”⁷² Massimo Perna has suggested that Linear B logogram *142 could represent goat hair.⁷³

12. The textile workforce in the Mycenaean wool economy

There is a great difference between fabrics in wool and fabrics in linen: linen and flax also require fundamentally different fibre processing before spinning; while wool particularly needs sorting and cleaning, flax needs a longer chain of mechanical and chemical processing and alterations before it can be spun. However, when both fibres are processed, cleaned and ready to be spun, then they follow similar work stages such as spinning, weaving, and finishing. Some Linear B tablets record linen textile workers but most tablets do not specify whether the workers deal with wool or flax, or both, but instead focus on the tasks and techniques, or their identity and location. The workforce in the palace-organised textile industry consists primarily of women and children.

As in textile production, textile workers are administered in categories based on

where they are located, whether they are under the supervision of a collector, and their professional specialisation. Many of the groups overlap, but among the scribes, these distinctions seem fundamental.

12.1 The textile workforce in Pylos

At Pylos, the administration of textile workers is divided between scribes 1 and 4: scribe 4 records the workers in the Further Province and scribe 1 records those in the Hither Province.

PY Aa 89 (4)
a-ra-ka-te-ja MUL 37 ko-wa 26 ko-wo 16 TA 1

(in the Further Province) 37 female spinners (literally, distaff women), 26 girls, 16 boys, and 1 (female) TA supervisor.

All these women and children receive monthly rations of food. These rations are allocated monthly and are standardized into T2 (20 litres) of figs and grain, respectively, for adults, and T1 (10 litres) of the same food products for children.

PY Ab 578 (21)
.A GRA 2 T 4 TA
.B pu-ro , pe-ki-ti-ra₂ MUL 7 ko-wa 4 ko-wo 4 NI 2 T 4

At Pylos, 7 female combers, 4 girls, 4 boys, and 1 (female) TA supervisor. 240 litres of figs, 240 litres of grain

On tablet PY Ab 578 the ration distribution key is clear: the 8 adult women (7 workers + 1 supervisor TA) each receive 2 T-units of grain, amounting to 16 T-units, and the 8 children each receive 1 T-unit, and this gives a total of 24 T units of grain corresponding to c. 240 litres.

A part of the Messenian workforce is designated by ethnic designations from Asia Minor, suggesting that these textile workers have a foreign origin, and had come to Pylos either through migration, captivity or the slave trade. This suggests that the Mycenaean wool economy depended on accessible and extensive labour which could even be acquired from outside. An example is the group of women from the island of Cnidus:⁷⁴

PY Ab 189 (21)
.A GRA 6 T 7 TA DA
.B pu-ro ki-ni-di-ja MUL 20 ko-wa 10 ko-wo 10 NI 6 T 7

At Pylos, 20 women from Cnidus, 10 girls and 10 boys, 670 litres of figs, 670 litres of grain, the supervisors TA and DA

12.2 The textile workforce in Knossos

At Knossos too, the administration of textile workers is divided among the scribes:⁷⁵ Scribe 103 records textile workers in Central Crete;⁷⁶ Scribe 102 records textile workers in the central southern part of Crete near Phaistos;⁷⁷ and yet another scribe records the textile workforce in western Crete.⁷⁸ Scribe 108 records textile workers under a collector.⁷⁹ (see also above).

12.3 The textile workforce in Thebes

The tablets at Thebes record wool allocated to individuals, to groups, and to a *do- (do-de 'to the house') probably a kind of workshop. Some Theban tablets record wool allocations to groups of women workers with occupational designations such as a-pi-qo-ro, *amphipoloi*, 'servants', or to a-ra-ka-te-ja, 'spinners', or to te-pe-ja, 'te-

pa makers'. They are even qualified as *new/ne-wa* or *old/pa-ra-ja*, respectively. Other wool allocations go to groups of women workers qualified by a man's name, a so-called 'collector' name, such as the designation *ma-ri-ne-we-ja-i* built on *ma-ri-ne-u* (Of 25) *pu₂-ke-qi-ri-ne-ja* built on *pu-ke-qi-ri* (Of 26).

Theban tablet Of 24 also reveals an important item of information on the administration of the textile workforce: the supervisor title *DA*, which appears anonymously at Knossos and Pylos, is here at Thebes given to a man called *ko-tu-ro₂*, and this suggests to us that at the other palace sites, this *DA* title is also reserved for men.

TH Of 34

(303)

.1 a-pi-qo-ro , ne-wa , ko-tu-ro₂ , DA , LANA 3 [PA] [
 .2 a-ra-ka-te-ja , pa-ra-ja LANA 1 [

12.4 The textile workforce in Mycenae

At Mycenae, there is a list of at least 25 women, sometimes recorded with their daughters (*tu-ka-te-qe* 'and daughter') and some of these women are also known from other tablets where they appear with textile workers (Fo 101 by scribe 53), but on this tablet, V 659, they all are recorded for *de-mi-ni-ja*, δέμνια 'beds'.

MY V 659

(61/House of the Oil Merchant)

.1 wo-di-je-ja , de-mi-ni-ja 1
 .2 ma-no , a-re-ka-sa-da-ra-ka 2
 .3 ri-su-ra , qo-ta-qe 2
 .4 e-ri-tu-pi-na , te-o-do-ra-`qe' 2
 .5 o-to-wo-wi-je tu-ka-te-qe 2
 .6 a-ne-a₂ , tu-ka-te-qe 2
 .7 pi-ro-wo-na ki-ra-qe 2
 .8 pu-ka-ro ke-ti-de-qe 2
 .9]-ri-mo-qe 2
 .10]ma-ta-qe 2
 .11]*82 1
 .12]-qe 2
 .13] vac.

inf. mut.

lat. dex.] , i-ri-[•] ke-ra-so , ki-ra-qe 2

MY Fo 101

(53/House of the Oil Merchant)

.0 vacat
 .1 a-ne-a₂ V 3 pa-ηq-ki V 1
 .2 ma-no V 1 a-na-*82 V 1
 .3 to-ti-ja V 1 we-i-we-sa V 1
 .4 ke-ra-so[] V 1
 .5 pi-we-ri-ši S 1 tu-mi-[]V 1
 .6 ko-ma-ta V 1 na-ta-ra-ma V[1
 .7 pe-ta-[•] V 1 pu-ka-ro V[1
 .8 o-ta-ki V 1[] vacat [
 .9 e-ro-pa-ke-ja OLE + W 1
 .10 a-ke-ti-ri-ja-i V 4
 .11-14 vacat
 .15 to-so OLE + W 2 S 1 V 1
 .16 vacat

This tablet records a total of 68.8 litres of olive oil distributed in various quantities to different textile workers at Mycenae, such as the *e-ro-pa-ke-ja* (female makers of? fabric or decoration), and *a-ke-ti-ri-ja-i* (dat. pl. de *ἄσκήτρια), 'female finishers'. The oil could be for professional use to facilitate weaving, as suggested by C. Shelmerdine,⁸⁰ but it seems to me more likely that the olive oil is part of the

ration system.⁸¹ This is supported by noting that the male supervisors *a-ne-a₂* and *pi-we-ri-si* in lines 1 and 5 receive larger portions of oil just as the male *DA* supervisors at Knossos and Pylos receive larger rations of figs and grain.

12.5 Wool and male labour

When discussing the wool economy, the general focus is on the significant labour of women and children. However, men, too, play a noteworthy role. The male contribution to the wool economy is, first and foremost, as shepherds. There are c. 700 shepherds recorded at Knossos, and certainly also hundreds at Pylos and at the other Mycenaean palace centres but very little evidence is preserved. Within the textile industry, boys take active part in the production and there are about the same number of boys and girls working for the palaces. Finally, men work as supervisors under the abbreviation *DA* in the textile work groups, and men are also collectors. A few men are mentioned as specialised wool textile workers, such as fullers and weavers. We know of their existence from the land registry documents: in a tablet from Pylos, Un 1322, one (or more) weaver(s) *i-te-we*, *histewes*, receive(s) a remuneration of figs and grain, like the textile women, but the transaction for the male weavers is termed *o-no* from the Greek root δὲννῆμι, which suggests another remuneration or dependency system.⁸² At Mycenae, wool is also given as *o-no* to dependents of the palace who are not working in textile manufacture (MY Oe 108 and 109). C. Varias Garcia concludes that there are “two types of palatial economic control in the Oe series: the *ta-ra-si-ja* system for making cloth and the *o-no* system, which supplies wool to nontextile workers as payment for their work.”⁸³ Thus, male textile workers are not administered together with the women and children, they do not receive rations in the same way, and men in the textile industry seem generally of a different social position. Of particular interest here is the royal (*wa-na-ka-te-ro*) fuller (*ka-na-pe-u*), which is a typical occupation in the wool economy. The royal fuller holds a plot of land.⁸⁴

PY En 74.23

(1)

pe-ki-ta , ka-na-pe-u , wa-na-ka-te-ro , o-na-to , e-ke , to-so-de , pe-mo
GRA T 2

pe-ki-ta (personal name), the royal fuller, has a plot (*o-na-to*), so much grain: 20 litres

Another male fuller called *a-ka-ta-jo* also holds land but is not qualified as royal:⁸⁵

PY Eo 269.B

(41)

a-ka-ta-jo-jo , ka-na-pe-wo , to-so-de , pe-mo , GRA 3 T 2

Of *a-ka-ta-jo* (personal name), the fuller, so much grain: 320 litres.

There is an extensive wool economy at Mycenae, too, since several male fullers, *ka-na-pe-we*, are recorded in the palace archives, both as receivers of the unidentified commodity *190 (Oi 701, 704) and as receivers of wool, probably for occupational purposes (Oe 119, 129). Likewise, at Thebes, wool is given to men both with and without occupational designations.

Like fuller, another wool occupational designation exclusively associated with male workers, is the *pe-re-ke-u*, a braider or perhaps weaver; the designation occurs at Thebes, Mycenae, and Pylos; we can be certain that this occupation deals with wool because it derives from the verb *pe-re-ke* attested at Knossos as the process which transforms wool into the textile type classified *164 (see the tablet, above,

13. Aegean Bronze Age wool and weights⁸⁶

It is significant that in the Mycenaean weight system, there exists a special unit for the wool, equivalent to $1/10$ of a talent (= 3 kg), or 3 double mina ($3 \times 2 \times 500$ g = 3 kg).⁸⁷ It is not a fractional sign but a sign of its own in the form of logogram *145 LANA.⁸⁸ As such, *145 corresponds to a commodity, and it also corresponds to a quantity (of wool). The LANA unit can be divided into 3 *M* subdivisions equal to 1 kg, and other commodities, too, use this fraction *M*.⁸⁹

Textiles in the Mycenaean culture are counted and measured in terms of wool weight when scribes plan and set targets for future production. This is surprising, because the weight of a textile is only one of many qualifying parameters; indeed it is surprising that fineness/coarseness, pigmentation, thread quality, density, etc., are not highlighted as quality parameters or as identification markers in the Linear B documents when recording a planned production. Some of these data, however, are recorded once the fabrics had been manufactured and stored.

Another striking feature in the Bronze Age wool economy is the well-consolidated relationship between the weight of a fleece and the weight system. In Knossian palace records, in particular the Dk and Dl series, 4 sheep yield the standard quantity LANA 1 of c. 3 kg, based on a fleece weight of 750 g. Similar fleece weights of 700–750 g are found in contemporary Near Eastern archives.⁹⁰ The integration of a fleece weight into the weight system is striking since fleeces naturally vary in weight. A ‘standard sized fleece’ does not exist in the real world. Furthermore, a fleece weight is increased by dirt, grease, and coarseness, and these elements in fact potentially decrease its value. It is significant that in the Mycenaean wool economy fleeces are not counted individually but compiled 4 by 4 and counted together in the wool unit LANA, which itself is only subdivided into 3 parts (*M*). Thus, the concrete counting has been replaced by an abstract counting and measuring system for wool. In fact several scholars have suggested that there existed a separate, parallel weight system for wool in the Minoan and Mycenaean administration.⁹¹ In addition, Nicola Parise also suggested that some weight units were specially used for textiles, in particular the unit equivalent to 6 units of wool or 18 kilos. This is the weight of the textile type *164 (see above).⁹²

It is a stimulating hypothesis that fleeces and woollen textiles could have developed their own weight units for the quantities that were natural and pertinent to this production. Another sign of this is the special wool fraction *PA* used only at Thebes instead of the conventional *M* fraction. R. Firth has made the convincing suggestion that *PA* designates a special kind of treated wool, i.e. the washed wool.⁹³

Another approach is to consider the possibility that the original major weight systems were indeed based on wool weights, and developed fractional values from this original system which then became indispensable to other commodities and materials as well. However, the combined wool logogram and metrogram *145 LANA is well integrated into the Late Bronze Age eastern Mediterranean system of the talent and the mina. Thus, instead of parallel systems, we should rather observe how textile production and wool assessment also constitute an integral part of the system of weight.⁹⁴ As Pia de Fidio concludes: “The measuring of wool with its specific fractional units gives us a further strong indication of the existence

of an economic sector that was indeed to some measure 'special', that was based on the accountability of the production of wool and its manufacture, and above all was well connected, by virtue of the identity in some of its choice of weights, to the greater international trade circuits of the Bronze Age."⁹⁵

14. Quantifying the Mycenaean wool economy

The wool economy was extremely labour consuming, and this impacted strongly on other branches of the economy since the wool labour force must be provided with food rations, perhaps also shelter, and other necessities. Secondly, the 100,000 sheep required close tending, and the some 700 shepherds probably demanded remuneration, control measures, and administration.

Thirdly, the extensive wool labour force required a management structure, and here the Mycenaean palaces had rather unanimously adopted the *DA* and *TA* supervisors,⁹⁶ and on another level, the collector system. The *DA* receives the quantities T5 and T5 of grain and figs monthly, but the *TA* receives only the same monthly rations as regular female adult textile workers, and the *TA* is therefore interpreted as a female supervisor. The remuneration or profit gained by collectors is unknown.

14.1. Quantification of the wool economy at Knossos

It is difficult to quantify the Knossian wool economy precisely and it will always remain based on plausible guesswork. However, Knossos has the most extensive wool records preserved and here it is possible to come very close to the individual wool worker and shepherds, and gain much information about sheep. There are an estimated c. 100,000 sheep under palace control in Crete. They each yield an average of 0.75 kg raw wool which amounts to an annual Cretan wool production of 75,000 kg, or 75 tons of raw wool. It were estimated that c. 40% of weight of the raw wool is discarded or used as isolation and padding/filling materials in mattresses and cushions, or used for felt; also, much of the weight of raw wool is made up of non-textile components such as grease, sweat, dirt etc. It may therefore be assumed that there remained 40 tons of clean and sorted wool annually left for textile production.⁹⁷

14.2. Quantity of wool at Mycenae

C. Varias Garcia has calculated that there are 1371 kg of wool preserved on the Mycenae Oe tablets found in Room 2 in the House of the Oil Merchant.⁹⁸ This corresponds to raw wool from 1828 sheep. However, it may be 1371 kilos of clean and prepared wool, and in that case it could have come from about double as many sheep.

14.3. Wool yarn production: volume

Spinning experiments have demonstrated that an experienced spinner can spin c. 600 m from 100 g of clean, combed, and prepared wool.⁹⁹ These experiments are based on spinning a quite coarse thread on a drop spindle with a whorl weighing 18 g. This would amount to 6 km/1 kg of cleaned and prepared wool, or 6,000 km from 1 ton of cleaned and prepared wool. If, quite hypothetically, the annual Cretan yield of 40 tons of clean wool was spun into thread on an 18 g spindle whorl, it would result in 240,000 km of yarn. This Cretan yarn would reach 6

times around the globe.

14.4. Wool yarn production: time

Spinning experiments have shown that an experienced spinner can spin c. 50 m per hour including time to sort the wool, prepare bundles of wool, spin, and wind the yarn. This experiment was based on wool spinning on an 18 g spindle whorl, a rather heavy tool which produces a fairly coarse yarn. Thus, we can set the yarn production time to 50 m per hour. However, spinning finer threads would take longer, even for an experienced spinner. Likewise, when spinning warp yarn which is being held in tension and subjected to weft beating, the spinner would probably spend more time and energy on spinning. Thus 50 metres per hour is an average set for the purpose of these calculations. This amounts to 50 km/1000 h, or 100 km yarn in 200 days (assuming a ten hours working day). If, again quite hypothetically, all the annual Cretan yield of 40 tons of clean wool were spun into thread on an 18 g spindle whorl, it would result in 240,000 km of yarn and it would take 480,000 days, or more than 1300 years for 1 person to produce this yarn! However, if the palace employed 1000 spinners, they would be able to transform all 40 tons into yarn within 480 days. Even though these figures are quite speculative, they highlight well why so many workers are needed for textile manufacture.

14.5. Quantifying the volume of rations to Mycenaean wool workers

For the estimates of rations, attention must be turned to Messenia and the calculations based on the Pylos inscriptions. The general estimate is that there are c. 750 women working for the palace in Messenia.¹⁰⁰ In addition to these would have been about the same number of children, probably from about the age of five to adolescence, and with a slight majority of girls.¹⁰¹ The standard monthly ration is $T2 = c. 20$ litres of grain and $T2 = 20$ litres of figs respectively for an adult worker and half these quantities for a child worker. If we thus estimate a workforce of 400 women and 400 children in Messenia occupied with wool, the annual expenditure in rations would be 144,000 litres of grain and 144,000 litres of figs.¹⁰² This amount of grain would weigh c. 144 tons, and would take up space of 144 m^3 ,¹⁰³ while the same amount of figs would weigh c. 100,000 kg/100 tons, and would take up space of 159 m^3 .¹⁰⁴

At Knossos, there seems to be much more emphasis on wool fibre production and processing and it is plausible that most, if not all, 500–1000 recorded Cretan textile workers were part of the wool economy. Regrettably, we have no secure data about how, if, and when rations were given to these women and children, but there are scattered indications of monthly allocations of food.

*

The Mycenaean Greeks had all the necessary natural resources for their wool textile production: the political organisation of the Mycenaean state had human resources for systematic breeding and for the cultivation and exploitation of plants for dyestuff; human resources and technical skills were necessary for the transformation of animal fibres into textiles; and the palace system required textiles for dependent personnel, for trade, and to maintain its own prestige. The complex system of skills, natural and human resources and networks can be perceived through the L and O series of Linear B tablets. The understanding of the

functioning of the textile industry also demonstrates how closely the wool and textile records are connected to the other series of Linear B texts, such as the records of labour, landholdings, and sheep.

As is demonstrated in this paper, we are biased by the unequal distributions of Linear B tablets among the centres: Knossos has rich evidence for sheep breeding and wool textile production; Pylos has fewer preserved records of sheep and of textile production, but ample evidence for the organisation of textile workers; Thebes and Mycenae have a little evidence of wool distribution but no preserved records of sheep. Since Pylos also has many fragments recording flax cultivation, this has led E. Stavrianopoulou to conclude that there was a fibre specialisation in the Mycenaean textile industry, with Knossos as a primary wool producer and Pylos as a linen producer and flax cultivator.¹⁰⁵ This conclusion is, on the one hand, logical, based on the current source situation. However, on the other hand, in my view it primarily translates the unequal distribution of Linear B tablets and not textile fibre specialisations among the palaces.

Regarding the position of wool within the Mycenaean palace economies and administration, it is significant that wool does not seem a part of the Bronze Age taxation system; instead, palaces mobilise hundreds of men for animal breeding and the plucking of wool, and set annual production targets for groups of women workers in villages. These are characteristic features of ration-paid work, or *corvée* work.

As regards wool consumption, the rather standardised wool textile products secured a coherent system in which these woollen textiles played a role in the economy. Some of them were probably used as remuneration or reimbursement to dependents or workers. Others are given to dignitaries for their services and fidelity such as the *e-qe-ta*.

The Mycenaean ruler seems to have had his own sector of the wool economy. Some woollen *te-pa* from the place *se-to-i-ja* are qualified as *wa-na-ka-te-ra*, royal *te-pa*. The wanax at Pylos has a royal wool fuller attached to his staff. The royal designation is also related to some activity related to purple in Crete, which again must have been applied to woollen cloth. However, it is worth noticing that *te-pa* textiles are quite common and generally not of the highest quality.

Sheep and wool are parts of the wealth of sanctuaries. Some smaller quantities of wool are allocated as 'donations' to divinities like the wool for the goddess Eilithya attested in the Knossos Od(2) set, or wool to *po-ti-ni-ja/Potnia*, *e-ra/Hera* and *e-ma-a₂/Hermes* at Thebes; some of the sheep breeding activities in Crete take place under *po-ti-ni-ja/Potnia* and *e-ma-a₂/Hermes* as well.¹⁰⁶ At Thebes, wool for the king and wool for the Mistress Potnia are recorded by the same scribe, on the same tablet:

TH 36 Of

(303)

- .1 no-ri-wo-ki-de ku LANA 1 a-ke-ti-ra₂ ,
 .2 po-ti-ni-ja , wo-ko-de , a-ke-ti-ra₂ ku LANA 1 wa-na-ka[

The estimates of the volume and quantification of the wool economy remain speculative and based on hypotheses, but nevertheless give guidelines as to the resources of labour, animals, grains and figs, time, and storage space involved in the Mycenaean wool economy. These estimates are based on experimental archaeology and knowledge generously shared by craftspeople with scholars. They allow us to make the following observations. First, the wool yields from palace

sheep are very high and it is unlikely that it was all spun by palace-paid workers and transformed into textiles, since there are simply not sufficient workers for this and textile workers represent an expenditure in terms of rations. Secondly, a significant part of the wool must have been in surplus, and this wool may have been integrated into other economic circuits as remuneration: to textile workers for their own home-production; as remuneration to shepherds and to other palace dependents. Thirdly, rations for textile workers represent a major expenditure; thus we can safely assume that this expenditure was worthwhile and would increase the value of wool considerably.

The intensive links between textiles and textile workers in Mycenaean times may have engendered a series of diseases and occupational hazards related to textile production. The intensification of sheep breeding and accumulation of animals could provoke rapid spread of animal diseases, some of which could be transferred to humans. Anthrax, also called 'wool-sorters disease' is caused by such bacteria, and it is likely that it already existed as a problem in Bronze Age wool economies. The term ἄνθραξ in Greek means charcoal, probably reflection the cutaneous reactions as dark skin areas. The etymology of anthrax is obscure. The bulk of names for diseases in Greek have an Indo-European etymology, but anthrax may have an Egyptian etymology.¹⁰⁷ This is not easy to explain. Anthrax was still a major challenge in European wool economies in the 19th century AD and it was Louis Pasteur who in 1881 discovered how to prevent the illness anthrax of sheep spread by the *Bacillus anthracis*.

Flocks of sheep are divided according to their gender, age, and wool yields in the Bronze Age, and are identified by their location and shepherd. Textile workers, too, are identified according to their gender, age, and occupation, and by their location and, sometimes, collector.

There is, furthermore, a gendered division of labour in the Mycenaean wool economy with men tending animals, monitoring the wool yields, and taking over supervision tasks; men also have a few specialized occupations in wool textile production as weavers and fullers; women and children are engaged in fibre processing, combing, spinning, weaving, and finishing. There is approximately a similar number of men and women engaged in the wool economy. Women and children tend to have more specialised occupations and technical designations; men are found as shepherds, supervisors, or in specific occupations, such as fullers and weavers, but the weaving occupation is shared by men and women.

The division of labour in textile production is based on the techniques and on fibre processing, and less on fibre type; there are several processes common to wool and flax, such as spinning, weaving, and finishing. The extra work with mechanical and chemical flax processing is indicated by the specific allocation of women and children for working with this fibre, the *ri-ne-ja*, linen workers, but there are no corresponding wool workers.

For most Mycenaean textiles, there is a striking absence of data on the textile fibre qualities and types. This can be explained by the administrative practices, and by the standardization of the textile repertoire and partly by the dominance of woollen textiles, *te-pa*, *pa-we-a* and *pu-ka-ta-ri-ja*, particularly at Knossos. Only *pa-we-a* can explicitly be made from either plant or animal fibres. Archaeological textiles of both wool and linen exist in the Aegean Bronze Age.

Wool from prehistoric sheep comes in many different hues: white, grey, black,

and reddish. This provides excellent opportunities for patterns and decoration, and the Linear B archives yield a rich terminology for decorations and decorative techniques. However, the impression of fairly standardised wool products remains. *Pu-ka-ta-ri-ja* is the most abundant Mycenaean wool textile type, recorded in several palaces and also recorded at Mycenae (X 508) to be sent to Thebes. Thus, we see fairly standardized wool textiles being circulated between the palace centres as a significant part of the Mycenaean wool economy.

Abbreviations

BAR British Archaeological Reports
BSA Annual of the British School at Athens
BICS Bulletin of the Institute of Classical Studies
SIMA Studies in Mediterranean Archaeology
SMEA Studi Micenei ed Egeo-Anatolici

Bibliography

- Alberti, M. E. (2005) I sistemi ponderali dell'Egeo nell'età del bronzo. Studi, storia, pratica e contatti. *Annuario della scuola archeologica di Atene e delle missioni italiane in Oriente* LXXXI, Serie III, 3 Tomo I, 2003, 597–640.
- Andersson, E. and M.-L. B. Nosch (2003) With a Little Help from my Friends: Investigation of Mycenaean Textiles with the Help from Scandinavian Experimental Archaeology. In K. Polinger Foster and R. Laffineur (eds), *METRON. Measuring the Aegean Age. Proceedings of the 9th International Aegean Conference. New Haven, Yale University, 18–21 April 2002*, Aegaeum 24, 197–205 and table XLV.
- Andersson, E, Mårtensson, L., Nosch and M.-L., Rahmstorf, L. (2008) New Research on Bronze Age Textile Production, *Bulletin of the Institute of Classical Studies* 51, 171–174.
- Andersson, E, Mårtensson, L. and Nosch, M.-L. (2009) Shape of Things: Understanding a Loom Weight, *Oxford Journal of Archaeology* 28.4, 373–398.
- Burke, B. (1999) Purple and the Aegean Textile Trade of the Early Second Millennium BC. In P. Betancourt, et al. (eds) *MELETEMATATA: Studies in Aegean Archaeology Presented to Malcolm H. Wiener*, Aegaeum 20, 75–82.
- Chadwick, J. (1988) The Women of Pylos, *Minos Supp.* 10, 43–95.
- Chantraine, P. (2009) *Dictionnaire étymologique de la langue grecque. Histoire des mots. Nouvelle édition*.
- De Fidrio, P. (1998–1999) On the Routes of Aegean Bronze Age Wool and Weights, *Minos* 33–34, 39–63.
- Del Frio, M., Nosch, M.-L., and Rougemont, F. (2010) The Terminology of Textiles in the Linear B Tablets, including Some Considerations on Linear A Logograms and Abbreviations. In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*. Ancient Textiles Series 8, 338–387.
- Del Frio, M. and Rougemont, F. (2012) Observations sur la serie Of de Thèbes, *SMEA* 54, 263–280.
- Diccionario Micénico* (1985, 1993), Vol. I-II, ed. F. Aura Jorro. Madrid.
- Diressen, J. (1999) *The Scribes of the Room of the Chariot Tablets at Knossos: An Interdisciplinary Approach to the Study of a Linear B Deposit*. Supl. *Minos* 15. Salamanca.
- Duhoux, Y. (1976) *Aspects du vocabulaire économique mycénien (cadastre-artisanat-fiscalité)*. Amsterdam.
- Firth, R. (1996–1997) Find-places of the Knossos Tablets, *Minos* 31–32, 7–122.
- Firth, R. (2012) An Interpretation of the Specification of Textiles on Ln 1568. In P. Carlier (ed.), *Études mycéniennes 2010. Actes du XIIIe colloque international sur les textes égéens, Sèvres, Paris, Nanterre, 20–23 septembre 2010*. Biblioteca di Pasiphae 10, 227–242.
- Firth, R. and Nosch, M.-L. B. (2002–2003) Scribe 103 and the Mycenaean Textile Industry at Knossos: The Lc(1) and Od(1) Sets. *Minos* 37–38, 121–142.

- Frangipane, M., Andersson, E., Nosch, M.-L., Laurito, R., Rast-Eicher, A. Möller-Wiering, S. and Wisti Lassen, A., (2009) Arslantepe (Turkey): Textiles, Tools and Imprints of Fabrics from the 4th to the 2nd millennium BC. *Paléorient*. 35:1, 5–29.
- Grmek, M. D. (1983) *Les maladies à l'aube de la civilisation occidentale. Recherches sur la réalité pathologique dans le monde grec préhistorique, archaïque et classique*. Paris.
- Gregersen, M.-L. (1997) Pylian craftsmen: payment in kind/rations or land. In Ph. Betancourt and R. Laffineur (eds), *Tekhne. Proceedings of the 6th International Aegean conference at Philadelphia, Temple University, April 1996*. *Aegaeum* 16, 397–406.
- Killen, J. T. (1964) The Wool Industry of Crete in the Late Bronze Age, *BSA* 59, 1–15.
- Killen, J. T. (1966) The Knossos Lc (Cloth) Tablets, *BICS* 13, 105–111.
- Killen, J. T. (1972) Two Notes on the Knossos Ak Tablets. In M.S. Ruipérez (ed.), *Acta Mycenaea. Proceedings of the Fifth International Colloquium on Mycenaean Studies, Salamanca, 30 March-3 April 1970*. II. *Minos* 12, 425–440.
- Killen, J. T. (1974) A Problem in the Knossos Lc(1) (Cloth) Tablets, *Hermathena* 118, 82–90.
- Killen, J. T. (1976) Linear B a-ko-ra-ja/-jo. In A. Morpurgo-Davies and Meid W. (eds), *Studies in Greek, Italic, and Indo-European Linguistics, Offered to Leonard R. Palmer on the Occasion of His Seventieth Birthday*. *Innsbrucker Beiträge zur Sprachwissenschaft* 16, 117–125.
- Killen, J. T. (1979) The Knossos Ld(1) Tablets. In *Colloquium Mycenaeanum. Actes du sixième colloque international sur les textes mycéniens et égéens tenu à Chaumont sur Neuchâtel (7 au 13 sept. 1975)*, 151–182.
- Killen, J. T. (1984) The Textile Industries at Pylos and Knossos. In C. W. Shelmerdine and T. G. Palaima (eds), *Pylos Comes Alive: Industry and Administration in a Mycenaean Palace*. *Archaeological Institute of America*, 49–63.
- Killen, J. T. (1987) Notes on the Knossos Tablets, *Minos* 20–22, 319–332.
- Killen, J. T. (1988) Epigraphy and Interpretation in Knossos Women and Cloth Records. In J.-P. Olivier and T. G. Palaima (eds), *Texts, Tablets and Scribes. Studies in Mycenaean Epigraphy and Economy offered to Emmett L. Bennett, Jr.* *Minos Suppl.* 10, 167–183.
- Killen, J. T. (1997) The Find-Places of the Tablets from the Western Magazines at Knossos: Some Matters Arising. *Minos* 31–32, 123–132.
- Killen, J. T. (2001) Some Thoughts on *ta-ra-si-ja*. In S. Voutsaki and J. Killen (eds), *Economy and Politics in the Mycenaean Palace States. Proceedings of a Conference held on 1–3 July 1999 in the Faculty of Classics, Cambridge*. *Cambridge Philological Society Supplementary Volume* 27, 161–180.
- Killen, J. T. (2007) Cloth Production in Late Bronze Age Greece: the Documentary Evidence. In M.-L. B. Nosch and C. Gillis (eds), *Ancient Textiles. Production, Craft and Society. Proceedings of the First International Conference in Ancient Textiles, held at Lund Sweden and Copenhagen, Denmark, on March 19–23, 2003*. *Ancient Textiles Series* 1, 50–58.
- Killen, J. T. (2012) The two Provinces of Pylos Revisited. In *Actas del Simposio Internacional: 55 Años de Micenología (1952–2007)*. *Faventia Supplementa* 1, 155–181.
- Karpat, K. H. (1985) *Ottoman Population 1830–1914. Demographic and Social Characteristics*. Madison
- Luján, E. (1996–1997) El léxico micénico de las telas, *Minos* 31–32, 335–370.
- Melena, J. L. (1975) *Studies on Some Mycenaean Inscriptions from Knossos Dealing with Textiles*. *Minos Supl.* 5.
- Melena, J. L. (1987) On the Linear B Ideogrammatic Syllabogram ZE. In J. T. Killen, J. L. Melena and J.-P. Olivier (eds), *Studies in Mycenaean and Classical Greek presented to John Chadwick (Minos 20–22)*, 389–457.
- Melena, J. L. (1996–1997) 19 raccords et quasi-raccords de fragments dans les tablettes de Cnossos, *Minos* 31–32, 417–422.
- Michailidou, A. (2008) *Weight and Value in Pre-Coinage Societies. Vol. II. Sidelights on Measurement from the Aegean and the Orient*. *Melethemata* 61.
- Nosch, M.-L. (1998) L'administration des textiles en Crète centrale, hors des séries Lc/Le/Ln, *BCH* 122, 404–406.
- Nosch, M.-L. (1997–2000) The Geography of the *ta-ra-si-ja*, *Aegean Archaeology* 4, 27–44.
- Nosch, M.-L. B. (2000a) Schafe unter Potnia und Hermes in Knossos. In F. Blakholmer (ed.), *Österreichische Forschungen zur Ägäischen Bronzezeit 1998*. *Wiener Forschungen zur Archäologie* 3, 211–215.

- Nosch, M.-L. B. (2000b) Acquisition and Distribution: *ta-ra-si-ja* in the Mycenaean Textile Industry. In C. Gillis, C. Risberg and B. Sjöberg (eds), *Trade and Production in Premonetary Greece. Acquisition and Distribution. Proceedings of the 6th International Workshop, Athens 1996*. SIMA CLIV, 43–61.
- Nosch, M.-L. B. (2001a) The Textile Industry at Thebes in the Light of the Textile Industries at Pylos and Knossos. In *Festschrift in honour of A. Bartonek. Studia Minora Facultatis Philosophica Universitatis Brunensis* n. 6, 177–189.
- Nosch, M.-L. (2001b) Kinderarbeit in den mykenischen Palästen. In F. Blakholmer and H. Szemethy (eds), *8. Österreichischer Archäologentag, vom 23. bis 25. April 1999*. Wiener Forschungen zur Archäologie 4, 37–43.
- Nosch, M.-L. B. (2003) The Women at Work in the Linear B Tablets. In A. Strömberg and L. Larsson Lovén (eds), *Gender, Culture and Religion in Antiquity. Proceedings of the second Nordic symposium on women's lives in Antiquity, Helsinki, 20–22 October 2000*. SIMA, Pocket-book 166, 12–26.
- Nosch, M.-L. B. (2004) Red Coloured Textiles in the Linear B Inscriptions. In L. Cleland and K. Staers (eds), *Colour in the Ancient Mediterranean World*. BAR International Series 1267, 32–39.
- Nosch, M.-L. B. (2006) More Thoughts on the Mycenaean *ta-ra-si-ja* System. In M. Perna (ed.), *Fiscality in Mycenaean and Near Eastern Archives. Proceedings of the Conference held at Soprintendenza Archivistica per la Campania, Naples 21–23 October 2004*, Napoli, 161–182.
- Nosch, M.-L. B. (2007) *The Knossos Od Series. An Epigraphical Study*, Veröffentlichungen der Mykenische Kommission Band 25, Mykenische Studien 20, Österreichische Akademie der Wissenschaften, Philosophisch-historischen Klasse, Denkschriften, 347. Band.
- Nosch, M.-L. B. (2011) Methodological Considerations Regarding the Parameters for the Classification of the Knossos Od Tablets. *Pasiphae* V, 29–37.
- Nosch, M.-L. B. (2012) From Texts to Textiles in the Aegean Bronze Age. In M.-L. Nosch and R. Laffineur (eds), *KOSMOS. Jewellery, Adornment and Textiles in the Aegean Bronze Age. 13th international Aegean conference held at Copenhagen, April 2010/13eme rencontre égéenne, Copenhagen, avril 2010*. *Aegaeum* 33, 43–56.
- Olivier, J.-P. (1967) La série Dn de Knossos. *SMEA* 2, 71–93.
- Parise, N. (1986) Pesi egei per la lana. *Parola del Passato* 227, 81–88.
- Parise, N. (1987) Una serie ponderale minoica e micenea er tessuti. *Annali dell'Istituto Orientale di Napoli* 9, 1–7.
- Perna, M. (2004) Recherches sur la fiscalité mycénienne. *Études anciennes* 28.
- Petrakis, V. (2012) 'Minoan' to 'Mycenaean': Thoughts on the Emergence of the Knossian Textile Industry. In M.-L. Nosch and R. Laffineur (eds), *KOSMOS. Jewellery, Adornment and Textiles in the Aegean Bronze Age. 13th international Aegean conference held at Copenhagen, April 2010*. *Aegaeum*, 33, 77–86.
- Petrakis, V. (2012a) Reverse Phonetisation? From Syllabogram to Sematogram in Aegean Scripts. In P. Carlier, Ch. de Lamberterie, M. Egetmeyer, N. Guilleux, F. Rougemont, J. Zurbach (eds) *Études mycéniennes 2010. Actes du XIIIe Colloque International sur les textes égéens, Sèvres, Paris, Nanterre, 20–23 Septembre 2010*. Biblioteca di Pasiphae 10, 523–536.
- Petruso, K. (1986) Wool-Evaluation at Knossos and Nuzi. *Kadmos* 25, 26–37.
- Ryder, M. L. (1993) Wool at Danebury: A Speculation Using Evidence from Elsewhere. *Oxford Journal of Archaeology*, 305–320.
- Shelmerdine, C. W. (1997) Workshops and Record Keeping in the Mycenaean World. In R. Laffineur and P. Betancourt (eds), *TEHNIH: Craftsmen, Craftswomen and Craftsmanship in the Aegean Bronze Age. Proceedings of the 6th International Aegean Conference, Philadelphia, Temple University, 18–21 April 1996*. *Aegaeum* 16, 387–396.
- Spantidaki, Y., and C. Moulherat (2012) Greece. In M. Gleba and U. Mannering (eds), *Textiles and Textile Production in Europe: From Prehistory to AD 400*. Ancient Textiles Series 11, 182–200.
- Stavrianopoulou, E. (1989) *Untersuchungen zur Struktur des Reiches von Pylos. Die Stellung der Ortschaften im Lichte der Linear B-Texte*. SIMA Pocket Book 77.
- Tournavitou, I. (1995) *The 'Ivory Houses' at Mycenae*. British School at Athens, Suppl. Vol. 24.
- Varias Garcia, C. (2012) The Textile Industry in the Argolid in the Late Bronze Age from the Written Sources. In M.-L. Nosch and R. Laffineur (eds), *KOSMOS. Jewellery, Adornment and Textiles in the Aegean Bronze Age. Proceedings of the 13th international Aegean Conference/13e rencontre égéenne internationale, 21–26 April 2010*, *Aegaeum* 33, 155–160.

- Waetzoldt, H. (2007) The Use of Wool for the Production of Strings, Ropes, Braided Mats, and Similar Fabrics. In M.-L. Nosch and C. Gillis (eds), *Ancient Textiles. Production, Craft and Society. Proceedings of the First International Conference in Ancient Textiles, held at Lund Sweden and Copenhagen, Denmark, on March 19–23, 2003*, Ancient Textiles Series 1, 112–121.
- Wiseman, D. J. (1953) *The Alalakh Tablets*.

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- ² Felt is not attested archaeologically but according to Michael Ryder, it can be made from the coat of the non-fleeced sheep and therefore was almost certainly the first form of woollen textile. Ryder 1993, especially page 309. However, this evolutionary scheme from felt to woven fabric is not supported in the archaeological finds, and it rather seems that felt technology is another development of wool use, for which the fibre selections and chaîne opératoire is quite different.
- ³ Spantidaki and Moulherat 2012, 189.
- ⁴ Andersson 2003; Andersson and Nosch 2003; Nosch 2012.
- ⁵ Nosch 2001a; Del Frio and Rougemont 2012.
- ⁶ Varias Garcia 2012, 155–160.
- ⁷ On this logogram, see Nosch 2007.
- ⁸ Driessen 1999 dates the RCT tablets to LM II and argues that they were sealed by fire destruction in LM III A:1.
- ⁹ Cf. Killen 1964.
- ¹⁰ Varias Garcia 2012.
- ¹¹ Nosch 2000a.
- ¹² Olivier 1967.
- ¹³ Killen 1964; Nosch 2007.
- ¹⁴ Varias Garcia 2012.
- ¹⁵ Nosch 2007, summarised in Nosch 2011.
- ¹⁶ Nosch 2007 and 2011.
- ¹⁷ Nosch 2007.
- ¹⁸ Firth and Nosch 2002–2003.
- ¹⁹ Varias Garcia 2012.
- ²⁰ Varias Garcia 2012, 157–158. He is also perfectly right to correct my erroneous statement (Nosch 2000b, 47) that these quantities are small. Indeed they are large and suggest textile production rather than decoration.
- ²¹ Varias Garcia 2012, 160.
- ²² Nosch 2001a; Del Frio and Rougemont 2012.
- ²³ Killen 1964; 1966; 1974; 1979; 1984; 1988; Melena 1975; Duhoux 1976; Lujan 1996–1997; Del Frio, Nosch, Rougemont 2010; Petrakis 2012.
- ²⁴ L series, Lc(1) series, Le series, Ln 1568, Ws 8153, X 1432. Le 641 te-pe-ja.
- ²⁵ Pylos: La 624, Ad 921 te-pe-ja-o; La 1393; Un 6; Mycenae: Oe 107; Thebes Of 35 te-pe-ja.
- ²⁶ Except on Ln 1568, see Firth 2012.
- ²⁷ So DMic. s.v. See the interpretation by Duhoux 1976, note 232 as 'folded' textiles. Melena 1987, 445, suggests the pu-ka-ta-ri-ja textiles "might represent some sort of loincloth or kilt."
- ²⁸ Melena 1987, 445 note 131.
- ²⁹ Melena 1996–1997, 418. Nosch 2004.
- ³⁰ See all forms in DMic. s.v. Outside the Knossos L(1) set, Lc and Ld series, pa-we-a is also found on MY Oe 127: pa-we-a₂; Oe 111: pa-we-si; KN L 104 pa-we-pi; L 651 pa-we-o; Wm 8499 pa-wo. Lujan 1996–1997, 337.
- ³¹ Nosch 2012.
- ³² Nosch 2004, 32–39. According to Killen 1979, 166 note 26, "the distinctive feature of pa-we-a ko-ur is that this was finished and decorated by groups other than those originally responsible for weaving it."
- ³³ Lc(1) 525–532, 534, 543, 551–553, 555, 558, 582, 1580, 5746, 7289, 7392, 7549, Ln 1568, Lc 646: all by scribe 103 and most from F10 while 583, 646 and 1568 are from F14, and 1580, 5746, 7289, 7392 are from unidentified place. Wb 8711 has unknown provenance and scribe. See Firth 1996–1997, 101–102 concerning 582.
- ³⁴ Cf. DMic s.v. Lujan 1996–1997.
- ³⁵ DMic. s.v. Lujan 1996–1997.
- ³⁶ Killen 1997, 126.

- 37 Killen 1964; 1966; 1974; 1979; 1984.
- 38 Concerning the ta-ra-si-ja cluster of te-pa, pa-we-a, tu-na-no, te-pa pe-ko-to by scribe 103, the following quantification may be made: The total non-collector target Lc(1) 536 records the production of 2,529 units of wool = 7,587 kg, see Olivier 1967, 91–92. The total collector target is not preserved but there are deliveries of 453 pieces of pa-we-a from collector groups on Ld(1) 587, see Killen 1979, and this equals 915 units of wool = 2,745 kg. Since the non-collector sector of the economy normally amounts to about 70%, the figure seems quite plausible. This gives a total estimated target for the ta-ra-si-ja production of 3,444 units of wool, or 10,332 kg which could be provided by 13,776 sheep.
- 39 Olivier 1967.
- 40 Set to 50% of the total amount of raw wool.
- 41 The average output of thread per hour is: c. 50 m of yarn/h (18 g whorl); c. 40 m of yarn/h (8 g whorl); c. 35 m of yarn/h (4 g whorl). This time estimate only takes the actual spinning time into account; time for the cleaning, sorting and preparation of the wool has to be added.
- 42 Killen 1966; 1974; 1979; 1984.
- 43 Andersson and Nosch 2003; Andersson *et al.* 2008; Andersson Strand *et al.* 2009.
- 44 Killen 1976.
- 45 Nosch 1997–2001.
- 46 The number of sheep at qa-mo is not preserved on the totalling tablet Dn 5559, but there are records of individual flocks qa-mo: 110 sheep on Da 1317; 100 sheep on Db 1099; 100 sheep on Dg 1316; 100 sheep on Dg 1318; 46 sheep on Dv 5278; 80 sheep on Dv 5297; 120 sheep on D 8787.
- 47 Dn 1094.
- 48 Duhoux 1976.
- 49 Nosch 2006.
- 50 Killen 2007.
- 51 Killen 2001. Nosch 2000b; 2006.
- 52 Olivier 1967.
- 53 Nosch 1997–2001.
- 54 Nosch 1997–2001, table 2; 2006.
- 55 Nosch 1998.
- 56 Killen 1979, 172.
- 57 Nosch 2007.
- 58 ne[can probably be reconstructed as ne[-wa meaning ‘new’ but with the administrative sense of ‘of the current year’. In other contexts we find the two contrasting concepts ne-wa and pe-ru-si-nu-wa, denoting deliveries from the current year or from the past year.
- 59 Killen 1979, 156.
- 60 Ld(1) 584; 587; 591; 598; 5894.
- 61 Ld(1) 571–577; 579; 583; 585; 649; 5601.
- 62 Killen 1979, 155.
- 63 Nosch 2004.
- 64 Killen 1987, 323.
- 65 Firth and Nosch 2002–2003.
- 66 Nosch 2004.
- 67 Burke 1999.
- 68 Nosch 2004.
- 69 Spantidaki and Moulherat 2012, 189. There is also a fabric of goat hair from Arslantepe, dated 3000–2900 BC which corresponds to the first part of phase VI B: Frangipane *et al.* 2009, 19–20.
- 70 Michailidou 2008, 186–189.
- 71 Waetzoldt 2007.
- 72 Michailidou 2008, 187.
- 73 Perna 2004, 278–280.
- 74 Chadwick 1988.
- 75 Killen 1972, 425–433.
- 76 The Ak(1) set from the west wing (F14).
- 77 The Ak(3) set from I2 (Spiral Cornice Room, in the northern part of the palace).
- 78 Ak 7827, 7830 and perhaps X 8330, see Killen 1993, 171–172; Nosch 2000b, 103.
- 79 The Ak(2) set was found in the West Wing (F7).
- 80 Shelmardine 1997, 390, notes 27 and 28.
- 81 Tournavitou 1995, 266–267; Varias Garcia 2012, 159.
- 82 Gregersen 1997.
- 83 Varias Garcia 2012, 159.

84 PY En 74; 609; Eo 160; 276.

85 Eo 269.B, En 659.18.

86 de Fidio 1998–1999, 39–63. Michailidou 2008, 179–191, 228–236, 244–261. Alberti 2005, 599–602 and table I.

87 de Fidio 1998–1999, 39–63. See this work for full references of the weighing systems in the various cultures of the ancient Near East.

88 The logogram is actually a monogram composed of two merged syllabograms, one of which is certainly the syllabogram for ma-, while the other element is either a re- or a ro-, and sometimes neither of them, or simply omitted. Thus, the Mycenaean scribe clearly imitates the ma- but does not have another specific sign in mind such as re- or ro-, and we can assume that the merging of the two syllables to the Mycenaean scribe had become entirely stylized into a logogram. In Linear A records, the same logogram exists but in Linear A it is clearly a combination of ma- and ru-. I thank John Killen for pointing this out to me, per litteras 8 January 2013. See also Melena 1987, 401 and Petrakis 2012a, 529–531.

89 Alberti 2005, 602: “La presenza di unità ‘parallele’ e di unità ‘speciali’, destinate alla misurazione di alcune categorie particolari di beni, accanto a unità ‘standard’, usate per misurare qualsiasi tipo di derrata, denota la sopravvivenza di alcune forme di calcolo concreto (concrete counting) all’interno di un sistema computazionale che si va sempre più astruendo dall’oggetto contato (abstract counting).”

90 A tablet from Alalakh (AT 361) demonstrates the same relationship with 1 sheep giving the weight of 75 Syrian shekels of wool, equivalent to 1 ½ minas, that is a fleece of 704.7 g. 1 Syrian shekel = 9.396 g. See de Fidio 1998–1999, 39–63. Wiseman 1953, 100. The same is attested at Nuzi, see Petruso 1986, 32.

91 Parise 1986; Petruso 1986; de Fidio 1998–1999 ; Alberti 2005, 602: “...è stata proposta l’identificazione di una serie parallela di x, specializzata nel conteggio della lana... Le grandezze di questa serie, denominata l, sono in relazione non solo con x ma anche con le grandezze del sistema ricavato dai testi micenei, cioè con la serie della doppia mina (M) e del talent (L), serie che può ben essere intesa, almeno a un certo punto del suo sviluppo, come un’altra serie parallela di x”.

92 Parise 1987. However, this suggestion is based on just one type of (not widely attested epigraphically) textile and a (not widely attested archaeologically) weight unit. See also the comment by Alberti 2005, 602: “Un ragionamento simile, basato sulla combinazione di pesi, segni di valore e fonti, ha portato Nicola Parise all’identificazione di una serie speciale per tessuti, basata però solo in modo estremamente indiretto su quella di x: il multiplo maggiore, r, pari alla quantità di lana necessaria per una singola pezza di tessuto, equivale a 6 l.”

93 Firth 2012.

94 de Fidio 1998–1999, 62.

95 de Fidio 1998–1999, 63.

96 TA is attested at Pylos and Knossos; DA is attested at Pylos, Knossos and Thebes.

97 Olivier 1967. This can be compared to historical end-19th century figures for wool production in Crete. The annual yield was of 356.7 tons of raw wool produced in Crete in the year 1894/5, according to Karpát 1985, 224. This increase in wool production is primarily due to breeds carrying much more wool than in the Bronze Age. I thank Richard Firth for this reference.

98 Varias García 2012, 157.

99 Andersson *et al.* 2008.

100 Killen 1984; Chadwick 1988; Nosch 2003. However, not all are engaged in wool textile production, and Killen has observed that a large number of the textile workers were occupied with the laborious processing of flax, especially those located in the Further Province at a distance from Pylos. See Killen 2012.

101 Nosch 2001b.

102 400 adult rations × 20 litres of grain × 12 months = 96,000 litres of grain.

400 adult rations × 20 litres of figs × 12 months = 96,000 litres of figs.

400 child rations × 10 litres of grain × 12 months = 48,000 litres of grain.

400 child rations × 10 litres of figs × 12 months = 48,000 litres of figs.

103 Assuming that 1 litre grain weight c. 1 kilo and measures c. 1 decimeter².

104 Calculated for figs, dried, uncooked. 1 kg dried uncooked figs has a volume of c. 1.5 litres according to <http://www.aqua-calc.com/calculate/weight-to-volume>.

105 Stavrianopoulou 1989. Stavrianopoulou 1989, 70: “Unsere Untersuchung zusammenfassend, können wir feststellen, dass wir im Gegensatz zu der Wollindustrie von Knossos von einer Flachindustrie bzw. Leinenindustrie von Pylos sprechen dürfen”.

106 Nosch 2000a.

107 It may have an Egyptian etymology according to Grmek 1983, 36 note 3. See also Chantraine 2009

20. Wool, Hair and Textiles in Assyria

Nicholas Postgate

The following contribution was prepared in the first instance to present the Middle Assyrian evidence for the production and processing of wool and goat-hair, which, as with many subjects, is more coherent than the scraps which survive from the Neo-Assyrian period. However, the nature of the sources necessarily involved dealing with textiles, and since these were not treated in the earlier volume (Michel and Nosch (eds) 2010) this chapter also includes a survey of the Middle Assyrian textile terminology. Neo-Assyrian textile terminology was already treated by Villard in the earlier volume and there is no need to cover this same ground, but where pertinent my text does also bring in Neo-Assyrian evidence for wool and goat-hair.

1. The principal Middle Assyrian sources

The most instructive sources for the production and usage of wool and goat-hair in the Middle Assyrian state are three archives, two from the provinces – one small (Tell Ali) and one larger (Dūr-katlimmu), the other from the private establishment of Babu-aḫa-iddina, an important personage at Aššur under Shalmaneser I and his son Tukulti-Ninurta I.

Atmannu

The first of these is the group of about 25 tablets from the town of Atmannu on the south-east bank of the Lower Zab, on the route between Aššur and Arrapha.¹ The tablets record the activities over a number of years of state-employed flock-masters (*nāqīdu*). Texts 1–6 are flock counts, i.e. lists of herds of sheep and goats. Some of these also mention sheep and goat skins and other by-products, including in one case (No. 2) goat hair and butter. Nos 7–11 give details of animals which had been taken from the flocks for various purposes, including cultic sacrifice and meals for the king's entourage, and as to be expected, the animals to be slaughtered are adult males or lambs. The remaining half of the archive (Nos 12–25) is solely concerned with sheep's wool, which seems to be exclusively transmitted to the textile production department of the government establishment ('palace') at Atmannu. As we might expect the shearing or rather plucking was an annual event, as implied by the phrase 'plucking (*buqūnu*) of the eponymate of PN',² and like the flock counts some of these wool distribution texts may well relate to the total annual output.

The amounts of wool recorded are received by various persons, sometimes by an official called Iddin-Marduk, whose professional designation is not given, once (No. 19) by a scribe, and three times by a certain Šarau, who is described as a ‘palace servant’ and as being ‘in charge of the dependent workers’.³ In Nos 12 and 17–18 the recipient is a chief weaver *rab ušpāri* (gal uš-bar-meš) called Ešidu.

The textile work was undertaken by women under the control of the palace, usually called ‘palace slave women’ (géme-meš é-gal^{im}). They need wool partly to fulfil their work-assignments (*iškāru*) which were calculated annually, but partly for other work they seem to have done under different arrangements. Some if not all of them must presumably have been weavers (*ušpartu*), but this term is not used in these texts, and no other textile workers are mentioned, so it is likely that in addition to weaving they undertook all the combing and spinning. There is no mention of dyeing or other processes in these texts.

The texts sometimes specify the purpose for which the wool was intended. The most explicit statement is in the total for No. 22 where Iddin-Marduk is recorded as having received 3 talents 22 minas (c. 100 kg) of wool “for the Cypriot *lubēru* garments, the *mašhuru* garments, and for the clothing of the dependent workers, for the eponymate of Qibi-Aššur”. Here and elsewhere part of the wool goes into the production of work-clothes for the palace dependants. These are called *mašhuru*, and are also issued to Nairian troops granted by the king to the high official Ušur-namkur-šarri (No. 24). The destination of the other items is more varied. Some are explicitly described as intended for use in the palace, including furnishings (No. 22 blankets [*šiprāte*] for beds; No. 23 stools); others have no specified destination, but there is no clear sign that any of their output was intended for consumption outside the palace sector.

To sum up, this little archive shows a state-run sheep farm aimed at producing some meat and a quantity of wool for use in the palace by palace staff and state dependent workers. The town of Atmannu had previously fallen under the kingdom of Arrapha, and obviously the Assyrians may have taken over the existing animal husbandry, but what we see at Tell Ali is extremely similar to the situation at the next site of Dūr-katlimmu (Tell Sheikh Hamad) on the western borders of Assyria.

Dūr-katlimmu

This will be obvious from a verbatim citation of a couple of passages:

After 4 talents 49 minas of wool (~145 kg) for the work-assignments and for clothing to the women servants of the palace had been issued, (there was) 14 talents of wool re[mainder,...].⁴

This shows clearly that just as at Atmannu wool was issued to the palace servant women both for their regular (probably annual) work-assignments, and for the production of other textiles broadly summarized as ‘clothing’ (*lubultu*). That such wool distributions came straight from the palace flocks is apparent from passages like this one:

[Aft]er 30 talents 36 minas [~960 kg] wool for work-assignment(s) and clothing to the women servant(s) of the palace had been issued, 8 talents 9 minas of wool (are left) in his hand, 2 talents 25 minas (goat-)hair (and) 0.55 homers butter (are) also in his hand.⁵

The wool here comes from a flock of 664 animals which are being checked, and

this passage listing the by-products precedes the count of animals. It shows that about 10% of the wool, along with all the goat-hair and butter,⁶ remained 'in his hand', that is under the flock-master's control, but the great majority of the wool went to the textile workers, either for their work-assignments or for 'clothing', making it very clear that the administration's primary interest lay in the sheep's wool.

From Dūr-katlimmu there is more evidence for the activity of the textile workers, notably in a single text from the antiquities market published in Tsukimoto 1992, and a group of texts edited in Röllig 2002. These make it clear that as at Atmannu, much of the output of the palace weaving establishment took the form of work clothes called *mašhuru* for state dependent workers, here referred to as 'farmers' (lú-engar-meš), but that a variety of other clothing types were also manufactured (*kusitu*, *išhanabe*, *alaziyu*).⁷ This text also shows that at this stage in the production line the Dūr-katlimmu scribes like those at Tell Ali made a clear distinction between the wool issued for 'work-assignments' (*iškāru*) and that intended for 'clothing' (*lubultu*).

Aššur

The use of the *iškāru* system of work-assignments is also encountered in our third principal archive, from the extensive household of Babu-aḥa-iddina. This archive includes a number of long and detailed letters between Babu-aḥa-iddina himself, and his staff back home at Aššur, which mostly concerned the administration of his private storerooms and their contents. Textiles play an important role, and wool is also mentioned as a commodity in its own right, although it is not clear if the household produced its own wool (probably). At least one of his regular staff is a textile worker, a 'knotter' (*kāširu* – see below on this profession). Along with this correspondence we have administrative texts documenting the movement of commodities. His establishment was not just a consumer but a producer of textiles: we have mention of stored textiles, but the household had a number of dependent female workers, some at least outside Aššur at a town called Lemutti-Marduk, who produced textiles under an *iškāru* contract. A few texts from the archive record the issue of these textiles to travelling merchants, including some destined for the Levant (Kinaḥḥu = Canaan), showing that one of the purposes of Assyrian wool production was still to generate international trade.⁸

Before leaving Aššur, I should also mention two large administrative lists which almost certainly both come from the same government office concerned with the production of garments and other textiles.⁹ One of these texts lists a variety of products which seem to have been manufactured by different 'houses' for use by the army;¹⁰ the other lists different garments with the names of the female workers to whom their production is assigned, and is particularly valuable in giving their weight; this text is summarized as 'work-assignments of the textile workers(?) for the eponymate of [PN]'.¹¹ Another sadly broken but still valuable Aššur text is MARV 3.8 listing 'clothing (*lubultu*) of Ištar' according to the summation at the end of the text, but including carpets (*mardutu*) as well as other textiles (*tūg-ḥi-a*).

These then are some of the social contexts which generated the documents from which we have to draw our data: it is obvious that they will reflect only the most organized sectors of the economy, whether forming part of state or private enterprises.

1.2. The raw materials

In this section wool will be considered first, followed by a short note on goat-hair.

Wool

Wool¹² came from the sheep in one of two ways: either in the annual plucking (*buqūnu*), or recovered from the skins of dead animals. The work of treating the skins came under the *sāpi'u*, a profession best attested in the Middle Assyrian texts. It was translated by Deller as Abdecker ('flayer, knacker', 'équarrisseur'),¹³ but in most instances he seems to be particularly involved with the production of items in felt (*feutre*, *Filz*; see below). As a result both Cancik-Kirschbaum and I proposed that this was his main role, but on reflection I believe Deller's position may be more accurate, and that his primary function was the processing of the skins.¹⁴ This would have meant that he had administrative responsibility both for the skins themselves, and for the wool to be recovered from them. Although in VAT 19549¹⁵ the steward issues wool to a *sāpi'u* 'for spinning', this artisan's frequent association with felt suggests that the wool from dead animals was better suited for felt than the wool from the annual shearing; this applies even to good quality wool from this source, as is shown by one tablet from the Stewards' archive at Aššur which records "10 talents of good-quality wool from out of the still unshorn sheep skins, additional(?) sacrifices under the authority of PN".¹⁶ As for the dead animals themselves, these may either have been deliberately slaughtered (as with the 'sacrifices' in the text just cited), or have suffered accidental deaths in which case the shepherds would have been expected to salvage the skin. The shepherds' responsibility for the skins emerges clearly from the Dūr-katlimmu archive, where there seems to have been an accepted norm of 7 deaths per 100 animals.¹⁷

In Babu-aḥa-iddina's correspondence wool is less frequently mentioned than finished woollen textiles, but it does occur. In KAV 106 one member of the household staff reports to another that Babu-aḥa-iddina has requested 'much wool' (*síg-meš ma-da-te*) for 'Suḥaeen garments' (*túg-ḫi-a su-ḫa-ie-e*), and asks him to [send] urgently any wool which remains [this much is clear, although there are difficulties in the text]. One internal receipt records wool measured in talents and minas received by one of the main household administrators (*Ma'nayu*) for a trading venture of Aḫu-[tab] the merchant, suggesting that as well as finished garments from the household's weaving enterprise, they may also have exported raw wool in some quantities.¹⁸

Wool is not frequently mentioned outside the three main contexts already discussed. MARV 1.27 records large amounts of wool (a total of 211 talents or c. 6330 kg) 'of the Palace' presented to foreign troops who had participated in Tukulti-Ninurta's triumphant campaign against Babylonia. Some of them, deportees from Šubria, received 10 minas or 5 kg each; others, from Katmuhu and Nairi, regions on the northern fringes of Assyria, 20 minas or 10 kg each. This text shows in the first place that the state had large surpluses of wool at its disposal, and secondly that the raw product was considered a suitable commodity to disburse as a form of remuneration.

Another text which also makes wool look a little like a form of currency, or at least a medium of payment, comes from the household of Urad-Šerua, where 10 minas (~5 kg) of wool is received by a man as advance payment for the manufacture of 1000 bricks in a village:¹⁹

10 minas of wool belonging to the daughter of PN, the wife of Urad-Šerua ... This wool is issued to him for moulding 1000 bricks in the village of Tušapi. He shall mould the bricks, deliver them, and (then) may break his tablet.²⁰

Although, as was made clear during the experimental session of the Nanterre conference, the wool from different animals and different parts of the same animal may differ significantly in its quality and technical characteristics, there are very few terms in the Middle Assyrian sources which could refer to differences in quality. One of these is *karu'u* found at Tell Ali in texts 16 (1 gú-un síg *ka-ru-a*) and 17–18 (30 ma-na síg-meš *ka-ru-ú*). This cannot merely mean ‘short wool’ since wool is construed as feminine plural, but perhaps *karu'u* could be used as a substantive in apposition. These are the only occurrences I have noted; in each case this kind of wool is listed second, after a different type. In text 16 the first entry is 56 ma-na síg-meš *ni-iš-ḥu*, where we have no parallels for *nišḥu* (presumably from *nasāḥu*, like *našḥu* “deported”), and its meaning is not obvious.

In texts 17 and 18 we have 1 gú-un síg-meš *a-na ši-im-gi*. This is equally obscure: it is paralleled by MARV 1.54:2 listing 6 minas of wool *a-na ši-in-gi*, and is presumably also related to occurrences of síg *ši-in-gu/a* in a Tell Taban text,²¹ and the passages ⅓ ma-na síg-za-gin-gi₆ *ši'*(copy: *pi*)-*in-gi* sig₅ (MARV 8.97:2–3) and 10 ma-na *zi-bu-tu* 8 [*š*]*i'*(translit. [*p*]*i*)-*in-gu* (VAT 19549:1–3, from the Stewards' archive).²² Unfortunately here *zi-b/pu-tu* is equally as obscure, though it appears to be a type of wool, and not a qualification of sheep as it is in other Middle Assyrian contexts (cf. simply CAD Z 125 s.v. ‘zipu’ (or *zibu*)). The use of sig₅ ‘good quality’ in MARV 8.97 is the only transparent term, and it is paralleled by VAT 19554 (also from the Stewards' archive) which begins: “10 talents of good quality wool from out of the ‘haired’ sheep-skins”.²³ It is hardly surprising that this epithet was sometimes applied, but in general the scribes did not seem concerned to record the quality of the product.

Compare also from Tell al-Rimah (west of Nineveh) the issue of three minas (~1.5 kg) of wool together with grain and pig-fat for soldiers on a campaign to Nihria.²⁴ This may be compared to the 6 minas of wool listed among miscellaneous textiles forming part of a package of items possibly issued in connection with *ilku* service in a Neo-Assyrian text.²⁵

Goat hair

The word *šartu* ‘(goat) hair’ is written syllabically at Tell Ali (No. 2:19), Dürkatlimmu,²⁶ and Aššur.²⁷ Its logographic writing is síg-ùz.²⁸ At Tell Ali and Dürkatlimmu it is clear that state flocks tended to include a relatively small number of goats with each herd of sheep. One Tell Ali text (No. 2) lists goat hair in addition to goat-skins, and No. 6 also includes the skins of adult and juvenile goats (*aZadu*) in the flock count. Goats are frequently listed (after the sheep) in other flock counts, but the incentive to keep goats is not made clear, and we have no references to the processing of goat hair although it was obviously used – perhaps especially for tents?

1.3. The processes

The processes applied to wool and woollen products are discussed briefly here in this order: airing, felting, spinning, knotting, weaving, fulling, and dyeing.

Airing

The wool and textiles in Babu-aḥa-iddina's storerooms were occasionally brought out to 'air'. In KAV 99, among other instructions concerned with textiles, Babu-aḥa-iddina instructs his staff to 'air' the dyed wool and issue it as part of [or: by means of?] the work-assignment" (*šig šir-pa na-ap-pi-ša i-na šà giš-gār di-na*). In KAV 109 they are ordered to open up the room with storage-chests (*bēt tupnināte*) and 'give (the contents) a good airing' (*nuppuša nappišā*) but this does not specify whether the contents were merely wool or finished textiles. As in well ordered households in other times and places this may have been an annual event, as Weidner 1959–60, Text 6 refers to "the airing of the eponym year of PN".²⁹

Felting

As described above, the production of felt seems to have been in the hands of the *sāpi'u*. We do not meet a technical verb for the process of converting wool to felt, but it is clear that the word *taḥapšu* means 'felt', and that it was used for hats, boots, coats of mail, and furniture.³⁰ A typical example of this is provided by MARV 3.64, a letter from Babu-aḥa-iddina requesting his subordinates to have the leather-worker make boots quickly. Ll. 12–16 say: "If he tells you there is no felt (*ta-ḥap-šu*) for Assyrian-style boots, take felt from the administrative control of (*ina pi-ti*) the Chief Feltmaker (*gal sa-pi-e*) (and) take madder (*ḥu-ra-ta*) [as much as] there is (and) hur[ry?] (and) issue (it) to him, (and) let him quickly make (them)". This provides evidence (1) that felt was used for making Assyrian style boots, and (2) that it could be obtained from the Chief Feltmaker. Felt appears to be handled on sticks, written (*giš*)-*pa*. It could well be that the lengths of manufactured felt were rolled round a stick, and this idea presumably lies behind its translation in MARV 3.57 and 59 as 'Rollen'.³¹

Spinning

Combing of wool is not mentioned to my knowledge, and spinning only rarely. There is one work and delivery contract from the Stewards' archive for a *sāpi'u* ('Feltmaker') to spin and deliver a quantity of wool.³² As stated above, I assume the palace servant women span as well as wove, but I know of no evidence to prove this (cf. below under *uṣpar(ē)u* on the situation in Babylonia).³³

Knotting

There are two big Middle Assyrian texts concerned with the large decorative textiles called *mardutu* which were either carpets (i.e. floor coverings) or more likely tapestries (i.e. wall coverings). One is the inventory text from Kār-Tukultī-Ninurta published in Köcher 1957–58, which lists among many other luxury items two such tapestries (Col. iii.27'–38'). The text is fragmentary, but one of these tapestries, which included ibex and rosettes in its design, is described as 'of knotter's work' (*ša šī-pār ka-ši-ri*). It is therefore presumably a pile-rug, in contrast to the second one which is described as "of weaver's work" (*ša šī-pār uš-bar*), and whose design included peoples, beasts, towns and an image of the king.³⁴ There are wall-paintings from Kār-Tukultī-Ninurta which are surely replicating textiles of this kind.³⁵ The same distinction of technique is noted in the other text, MARV 3.8, from the Stewards' archive (Ass. 13058): 2 garments ([*túgl-ḫi-a*) of weavers' work (ll. 27'–28' and 29'–30', with 35'), and 2 carpets (*mardutu*) of knotters' work (*ša kin ka-šēr*, ll. 31'–32' and 33'–34' with l. 35'). These items were certainly luxury goods, as they were described as 'the clothing of Ištar' and the work is directed by the

king.³⁶

The clear differentiation of these two manufacturing techniques seems to support the understanding of *kāširu* as literally a craftsman who works with wool and ‘knots’, that is to say manufactures knotted carpets, as opposed to the weaver (*ušpār(t)u*) who presumably produced most woven textiles including kilims, and this pair of textile workers is occasionally listed together in contemporary Middle Babylonian texts too (CAD K, 264).³⁷ However, one of the members of the staff of Babu-aḥa-iddina’s household, called Adad-tura, was a *kāširu*, and the contexts in which he appears occasionally suggest that his responsibilities or expertise extended beyond the manufacture of carpets to other finished textiles. The resultant uncertainty about his technical activities has been well described by Jakob,³⁸ but like him I do not think that we need go as far as CAD K 264–5, which lists two entirely separate professions as ‘*kāširu* A’ (a craftsman producing textiles by a special technique) and ‘*kāširu* B’ (an official of low rank in a household). In contrast to the weavers, there is no mention of a female ‘knotter’ (presumably a *kāširtu*), which may seem a little strange given the widespread employment of women in modern day knotted carpet manufacture.

Weaving

Weavers in Assyria are regularly known as *ušpār(t)u* (see below, under textile workers); for their primary activity of ‘weaving’ on a loom Akkadian appears to know two verbs, *maḥāṣu* and *šatû*, but neither is definitely attested in the Middle Assyrian texts. The meaning ‘weave’ for *maḥāṣu* may be intended in a letter from Dūr-katlimmu concerned with the processing of flax, where both the verb *kašāru* and *maḥāṣu* are used, but in a context where the precise nature of the processes remains unknown.³⁹ As for *šatû* the derivative *šatûtu* meaning ‘weaving activity’ or similar is probably attested in KAV 103.13.

As we have seen, government palaces employed numbers of female workers described as ‘weavers’, but it is not known whether they would have been physically within the confines of a palace complex, or in separate workshops.⁴⁰ Both in the private and the public sector they were given ‘work-assignments’ (*iškāru*), which probably means that they were issued annually with an agreed quantity of raw wool from which they were obliged to produce a fixed number of finished textiles.

Archaeological evidence for weaving establishments is scarce, but groups of spherical clay loomweights were found in a building of Neo-Assyrian date on the Tigris north of Nineveh, at the site of Khirbet Hatuniyeh.⁴¹

Fulling?

I know of no Middle Assyrian terminology which would refer to the fulling (fouler, walken) of cloth. The one reference to a ‘fuller’ (written *lú-túg*) is in the law code (fragment M), and he here appears more to be concerned with cleaning of an already manufactured garment, than with an interim stage in the production of cloth. See CAD A/ii, 447 for comment on this apparent dual function of the *ašlāku* in other contexts (although I am not 100% convinced this is the correct Assyrian equivalent of *lú-túg*).

1.4. Dyeing

There are various words referring to wools dyed in different colours, and it is clear

that some dyed wool was traded as a commodity in its own right, rather than being given its colour by textile production workshops, perhaps because there were different specialized centres e.g. on the Phoenician coast or in the 1st millennium at Arpad.

šapā'u 'to soak'?

A technical term known from a single passage possibly referring to dyeing is *šapā'u*:⁴² three *lubēru* garments issued by the Steward 'to soak it for (=to yield?) black wool' (*ana* [síg]-za-gìn-g[i₆] *ana ša-pu-e tadnaššu*).⁴³ Since these are garments rather than raw wool, it implies that this process was applied to already woven textiles rather than to wool. Whether it was merely soaking, or dyeing to give colour, it was presumably the function of the textile worker designated *šāpiu*, two of whom are mentioned in a text from the antiquities market (see below, under textile workers).

šarāpu 'to dye'

The normal word for dyeing may have been *šarāpu*, which is only rarely attested but gives us the not uncommon term *širpu* 'dyed wool'.⁴⁴ It is familiar from the 1st millennium profession *šārip duhšie* which refers to leather-workers and was presumably well known in Middle Assyrian times too, since the leather product known as *duhšī'u* (or similar) ⁴⁵ is well attested (plenty of examples in MARV 10).
⁴⁶. Note also the materials for dyeing a royal cushion? (1 *ma-ri-ni ša giš-gu-za ša lugal a-na ša-ra-BE*) in A.305 mentioned below.

širpu 'dyed wool'

As already mentioned, scribes often refer generally to 'dyed wool', using *širpu* which does not specify any particular colour.⁴⁷ In KAV 100 Babu-aḥa-iddina instructs one group of his staff to 'open the room of chests (*bēt tupnīnāte*) and issue" to another group of his staff the "dyed wool, work-assignment of the town of Lemutti-Marduk" (*šir-pa giš-gār ša uruL. di-na*). In KAV 99, among other instructions concerned with textiles, Babu-aḥa-iddina orders his staff to "air the dyed wool and issue it within the work-assignment" (*síg šir-pa na-ap-pī-ša i-na ša giš-gār di-na*). Later in the same letter he states: "I have sent to you 25 minas (~12.5 kg) of red wool (ta-bar-[r]i-ba ša ga) and 20 minas (~10 kg) of purple(?) wool (*ḥa-á[š-m]a-na*)" to be returned to the storeroom. 'Dyed wool' (*širpu*) is mentioned in KAV 105, another letter from Babu-aḥa-iddina, as the material of sleeves (*túg a-ḥa-tu ša šir-pī*). Presumably the plural form *šir-pa-ni* attested in Köcher 1957–58 Col. iii.31 implies 'dyed wools (of various colours)' (so Landsberger 1967, 147). The recently published texts from the Stewards' archive include two referring to 'coats of dyed wool' (*naḥlapātu* [wr. *túg-gú-è(-meš)*] *ša šir-pī*).⁴⁸

birmu 'coloured trim?'

The word *birmu*, which is particularly common in Assyrian royal inscriptions in the phrase *lubultu birme*, clearly refers to a decorative fabric, but its precise meaning remains unclear. In the Middle Assyrian administrative texts it is most frequent in the phrase *ša birme*, found after *lippu* 'wrap' or 'roll', but also after *naḥlaptu* 'coat' and *kusitu* 'robe'.⁴⁹ CAD B, 257 translates 'trim woven of several colors (used to decorate garments)', but Landsberger has rejected this, claiming that it is neither merely a trimming, nor necessarily multi-coloured.⁵⁰ One suspects that 'multi-coloured' is chosen by CAD to give full weight to their understanding of the verb

‘barāmu B’ as ‘to be multicolored, speckled, pied, variegated’ (B 103a), and this precise meaning does not emerge from the contexts in which *birmu* itself is attested, so that Landsberger’s objections on this point may be reasonable. On the other hand, despite his criticism of CAD B’s ‘trim’, it has to be said that several of the Nuzi and other contexts (cited in the CAD article) do rather favour seeing *birmu* as a component of a garment rather than a quality of wool. If it meant literally a cloth strip acting as an edging to a garment, it would be necessary to identify some difference from *sūnu*, q.v.

Dyeing agents

The raw materials used in the processing of wool included alum (*abnagabiu*), and madder (*hurutu*).

abnagabiu = alum was used as a mordant by dyers of textiles and leather. Mentioned alongside madder regularly in Middle Assyrian and occasionally in Neo-Assyrian sources.⁵¹ The two substances are used together in treating goat and bull skins as attested by two Babylonian ritual instruction texts.⁵²

hurutu = giš-hab: ‘madder’ (Krappe, garance). This identification is due to Stol,⁵³ and is prompted by an Ugaritic lexical equation with a word which turns up in Aramaic and Arabic. Madder (*Rubia tinctorum*) is regularly used in conjunction with alum (*abnagabiu*), as already in the Mari texts, for dyeing both woollen textiles and leather items. A few Middle Assyrian texts mentioning both madder and alum are probably dealing with leather,⁵⁴ but there is at least one occurrence certainly involving wool (MARV 3.8). Madder is required for the dyeing of felt for boots in VAT 8863 (= MARV 3.64) from Babu-aḥa-iddina’s archive, and A.305, surely from the Steward’s archive, lists 14 minas of madder and $4\frac{2}{3}$ minas of alum (read NA₄-ga-[b]i-ú!) for dyeing a felt cushion.⁵⁵ Ass. 13058gq also from the Steward’s Archive (cited Donbaz 1988, 73) records 9 talents (~270 kg) of *hu-ru-tu-meš*, composed of $7\frac{1}{2}$ talents of ‘madder vines/grapes(?)’ (giš-hab geštin-[meš]) and $1\frac{1}{2}$ talents of ‘madder inflorescences(?)’.⁵⁶ Research into mediaeval textile industries might reveal how large an operation 270 kg of madder would imply. It seems considerable, but note that Neo-Assyrian administrative texts from the palace at Nineveh mention still larger volumes including 60 talents (SAA 7.116) or 109 talents (SAA 7.115). 109 talents is approximately 3270 kg.

Various dyed wools

We do not meet other terms for dyes, but there are several words for specific colours of dyed wool. The lexical situation as set out in remorseless detail by Landsberger (1967), is horribly complicated, and I doubt if we have made much progress since that article was written. Logograms are frequently used but can vary within and between text groups, and the Neo-Assyrian equivalences, as given in the Practical Vocabulary of Aššur,⁵⁷ can be quite different from those which are correct for Middle Assyrian. I cannot attempt to improve on previous efforts to identify the different words with specific colours or dyes, and will merely record the main terms. If we follow CAD these are *argāmannu* ‘red purple wool’, *tabarru* (and variants) ‘(a red-dyed wool)’, and *takiltu* ‘(a precious blue-purple wool)’. Less common in Middle Assyrian are *ḥašmānu*, and perhaps *uqn(i)ātu*.⁵⁸

In textile lists garments or parts of garments may be described as ‘white’ (*babbar* = *paši’u*, see below), but this adjective is not found qualifying wool. Presumably these items were either of linen or undyed sheep’s wool.

uqnātu = *síg-za-gìn CAD U/W, 193–195: ‘a dark or blue-dyed wool’*

No Middle Assyrian syllabic writing attested (it would presumably give a form *uqniātu*), but the logographic writing may be present in MARV 10.77:1 [1] *túg-gú-è síg-za-gìn-meš*. Elsewhere *za-gìn* is normally followed either by *sa₅* or *gi₆* and on the basis of this single damaged passage it is difficult to be certain if we should include *uqn(i)ātu* in the list of Middle Assyrian terms.

argāmannu = *síg-za-gìn-sa₅*

Not attested syllabically in Middle Assyrian texts, but the alternation of syllabic spellings with the logogram in Assyrian annals as cited in CAD A/ii 253 seems sufficient to establish the reading *argāmannu* in Standard Babylonian (as opposed to the equivalent *suntu* ‘red’ in the Neo-Assyrian vernacular as given in the Practical Vocabulary). With *takiltu* this is the commonest of Middle Assyrian dyed wools and the two are often listed alongside one another.⁵⁹ In the annals, in the Neo-Assyrian lexical text Practical Vocabulary of Aššur (l. 227) and in Middle Assyrian documents we meet ‘coats’ (*naḥlaptu*) of this wool. MARV 3.78 mentions this type of wool and ‘5 talents’ in a text concerned with merchant’s expenditure of capital in the form of lead, but the tablet is too damaged to be certain that it refers to raw wool rather than a textile manufactured from it, or that the weight refers to the wool rather than a metal. Given its frequency, perhaps we should consider *argāmannu* (or whatever Akkadian word is represented by the logogram *síg-za-gìn-sa₅*) as ‘(regular) red wool’, and this may be supported by the entry in an administrative text which reads “1 mina of *argāmannu* instead of *tabarru*” (1 ma-na *síg-za-gìn-sa₅ ki-mu ta-bar-ri* MARV (1). 24:9’, cf. 11’).

takiltu = *síg-za-gìn-gi₆*

For occurrences and writings see CAD T 70–73 “(a precious blue-purple wool)”. Lexical evidence for reading *síg-za-gìn-gi₆* as *takiltu* is lacking, and as with *argāmannu* the equivalence depends on the occurrence of the syllabic and logographic writings in parallel passages of royal inscriptions.⁶⁰

In the Practical Vocabulary the Neo-Assyrian equivalent is given as *ša-li-tú* ‘black’.⁶¹ *síg-za-gìn-gi₆* occurs fairly regularly in Middle Assyrian administrative contexts alongside *argāmannu* (written *síg-za-gìn sa₅*). MARV 3.8:2 appears to record *síg-za-gìn gi₆ ša a-šà* ‘*takiltu* of the field’ and *síg-za-gìn gi₆ ša uru-šà-uru* ‘*takiltu* of the Inner City (of Aššur)’ but the context is not very revealing.

The Akkadian *takiltu* is equivalent of Hebrew *tekēleth*, for which see Dalley 2000, 4 “now established as the deep blue dye produced from a particular group of murex shells” citing Ziderman 1987, where *argāmannu* is assigned to one species of murex, and *takiltu* to another. It seems at least arguable, if not demonstrable, that the coloured wools whose logogram contains the element *za-gìn* (elsewhere the Sumerian for ‘lapis lazuli’) received their colour from murex shells which may have been considered a species of stone. This would fit with Ziderman’s position. We don’t know what these shells were called, but it seems probable that these two types of wool were normally imported from the west ready dyed.

tabarru, tabarribu, tabribu = *síg-ḫé-me-da*

The form *tabarru* must be the same word as *tabarribu* and *tabribu*, of which CAD T 31a writes “both forms [sc. *tabribu* and *tabrimu*] are borrowings from Hurrian *tawarriwa*” [examples cited CAD T 22a s.v. *tabarru*], and with the same lexical equivalent it is plain that *tabarru* is merely another form of the word. For both

forms CAD offers the translation ‘(a red-dyed wool)’, and refers to Landsberger 1967.⁶² At times the word may seem to refer to coloured wool in general, as in the phrase ‘(goat-)hair, wool, coloured wool’ (*šar-tu ši-pa-tu tab-ri-bu* MARV 10.23:7), but it does seem to have been red wool of some description. The logogram (síg-)hé-me-da is not composed with the element za-gin, and the best attested dyeing substance in Assyria, which is ‘madder’ is unequivocally a plant (not from shells). Conceivably therefore this is a locally produced coloured wool using madder. However there is no indication in the texts of an association between (síg-) hé-me-da or any of its Akkadian forms and madder (*hurutu*).

A technical term found with this kind of wool is *huruḥarātu*, which is surely the Middle Assyrian forerunner of the Neo-Assyrian *huḥḥarāt* found in the phrase *hu-ḥa-rat tabribi* (hé-med) in SAA 7.115 and 121. The meaning of this word is yet to be determined, and any explanation must take account of its occurrence in both Middle and in Neo-Assyrian texts applying to a sort of bread.⁶³ The most informative passage is Ass. 13058 hk from the Stewards’ archive:⁶⁴ “36 minas of *ḥ*. of red wool for 12 minas of red wool”.

The continuation of Ass. 13058 hk is unfortunately broken, but the ratio of 36:12 or 3:1 is almost exactly matched in a Neo-Assyrian text in which one section gives a list headed with síg-hé-med *akiltu* “Red wool – consumption” and there follow three lines: “7 talents 10 minas ugu nu, 22 talents *huḥarāt* of red wool three-fold.”⁶⁵ Although the significance of the signs ugu nu remains obscure, it is clear that the commodity *huḥḥarāt tabribi* can weigh three times *tabribu* alone and the ‘three-fold’ shows that this was not a coincidence. The following section has a similar entry of 15 talents 10 minas giving “30 talents 20 minas red wool two-fold”. It seems that *tabribu* ‘red wool’ must have been combined with another substance at a ratio of 1:2 or 1:1 to yield the *huḥḥarāt tabribi*. Whether the additional substance was another type of wool or something quite different is obscure to me.⁶⁶

ḥašmānu

Attested only once in Middle Assyrian, although not infrequent at Ugarit and other western places. A Hittite inventory text edited by Goetze (1956.³⁴) distinguished three wool colours: síg-za-gin (‘blue wool’), síg sa₅ (‘red wool’), and síg *haš-ma-nu* (‘dark red wool’).

The Assyrian attestation is in a letter from Babu-aḥa-iddina to his household staff, which ends with a section reading: I am dispatching to you 25 minas red wool (*ta-bar-[r]i-ba*).... (and) 20 minas *ḥa-á[š-m]a-na*. Take delivery of it, and consign it to the storehouse.”⁶⁷ In 1st millennium Assyria the Practical Vocabulary (l. 207) indicates that the word had been replaced by *urṭū*, which may be of Hurrian origin since it is first attested as a dye(?) at Nuzi.⁶⁸

‘white’ (*paši’u* = BABBAR)

Various garments may be qualified as ‘white’, including most frequently *naḥlaptu*, but also *šaḥarrātu*, *nēbuḥu* (belt), *kubšu* (headdress), and the *sūnu* of an *išḥanabe*. As already mentioned, by ‘white’ I assume the scribes referred either to undyed wool from white sheep, or to linen.

1.5. Textile workers

The professional terms in use in Middle Assyrian texts referring to those involved in the textile industry were comprehensively listed already by Jakob.⁶⁹ In most

cases there is little to add to his data and conclusions, and the terms listed here follow his order.

ušpār(t)u = lú/munus-uš-bar⁷⁰

Conventionally translated ‘weaver’ (either male or female), but a more general term like ‘textile worker’ might prove safer. Note CAD I 256: “The *išparu*’s not only wove but also did the spinning, as shown by the MB reference where a slave girl is given to an *išparu* for spinning”, reinforcing the observation made above. Female weavers tend to be mentioned in groups, male *ušpāru* singly.

Where there were several working together there would be a ‘chief weaver’ or ‘overseer of the weavers’. A woman is mentioned in this role at Aššur (gal munus-uš-bar-meš: MARV 3.5:15’). At Atmannu, a man (gal(-meš) uš-bar-meš Nos 12:6–7; 17–18:6–7); here the women who did the work are merely referred to as ‘slave women of the palace’, rather than given the professional title. Note a similar situation at Dūr-katlimmu: “Eine eigene Berufsbezeichnung *i/ušpartu* bzw. ^muš-bar ... kann ich in den Tall Šēḫ Ḥamad-Texten allerdings nicht nachweisen, Das mag darin begründet sein, daß in den Verwaltungstexten ‘Funktionen’ und nicht ‘Berufe’ eine Rolle spielen”.⁷¹

*māḥiṣu*⁷²

In Middle Assyrian texts this profession is mentioned just once at Tell Billa, in a broken context concerned with textiles. Both here, and in other Akkadian texts, it is not obvious to me how this term (which literally means ‘beater’ and may refer to the action of a weaver in beating down the threads which form the weft) differs from the possibly more general term *i/ušpāru*.

*ša mašḥere*⁷³

The persons referred to by this phrase were probably also ‘weavers’ (*ušpār(t)u*) who specialized in the production of these everyday working garments. It is not clear that this is a real professional term, rather than an administrator’s shorthand. In some of the passages cited it may not be a designation of the workers at all.

kāṣīru = lú-túg-ka-kéš⁷⁴

Translated as ‘Knüpfer’ already by Landsberger. Whether this craftsman was exclusively or primarily a carpet-maker is discussed above (pp. 407–408). As noted there, female practitioners of this craft or function seem not to be mentioned.

ašlāku = lú-túg-babbar⁷⁵

As Jakob’s thorough discussion explains, we cannot be sure if this craftsman is merely a ‘washer’ of textiles, or also functions as a ‘fuller’ in the production process (see under Fulling? above, p. 408).

*šāpiu*⁷⁶

Understandably rendered ‘Färber’ (dyer) by Jakob. This profession is attested just once in a tablet from the antiquities market in which two men are called *ša-pi-ú-tu*.⁷⁷ The connection with textiles seems to be supported by the subsequent mention of persons taking ‘garments’ (túg-ḫi-a-me). This occurrence is now reinforced by the verb *ana šappu’e* in the Aššur text cited above (p. 409), and the writing with *pi* casts some doubt on Landsberger’s comments referred to there.

abbāšu

This is not listed by Jakob. It is a rare word not yet fully understood.⁷⁸ The most

suggestive passage is MARV 3.5.40' which is the summation of a list of textiles assigned to predominantly female craft-workers, one of whom has the title 'chief (female) weaver' (gal munus-uš-bar-meš l. 15'). The line reads giš-gàr-meš ša ab-ba-še š[a l]i-me P[N] "work-assignments of the ... for the eponymate of PN".

The new passage MARV 10.5:23: ina ud-me man [ud]u-siskur-meš a-na as-mit-te ab-ba-še ["on the day the king [.....] the sacrifices for the stele(?) of the *abbaše*" is unhelpful. Weavers are occasionally the subject of the very common verb *epāšu* and it remains unclear whether we are looking at a specialized usage of a single word, or two lexemes.⁷⁹

2. The Neo-Assyrian sources

Unlike some of the Middle Assyrian evidence, the Neo-Assyrian sources for wool and associated activities are uniformly scrappy. Where relevant Neo-Assyrian evidence has been adduced during the discussion of the Middle Assyrian material, but two points may be picked out for separate comment here.

2.1. 'Black' and 'red' wool

As attested by the Neo-Assyrian "Practical Vocabulary of Aššur",⁸⁰ the Neo-Assyrian scribes had retained *tabribu* (wr. sīg-ḥé-me-da or ḥé-med), but had usually abandoned the earlier rather cumbersome logograms sīg-za-gìn-sa₅ and sīg-za-gìn-gi₆ and replaced them with simply sīg-gi₆ and sīg-sa₅.⁸¹ These logograms are listed in the Practical Vocabulary of Aššur (ll. 210–211), but without Akkadian equivalents. Conceivably these should be *šalittu* 'black' and *suntu* 'red', which are however listed as the equivalents of sīg-za-gìn-gi₆ and sīg-za-gìn-sa₅ (instead of *takiltu* and *argāmannu* which are thought to be the 2nd millennium equivalents, see above). In this curious situation it remains uncertain whether 'black' wool really means that, or stands for *takiltu*, rendered 'blue purple wool' by some modern translators. What is curious is that in three cases (quite a high proportion of the available contexts) we find quantities of 'black' and 'red' wool mentioned together,⁸² and this is reminiscent of the occurrence alongside each other in the Middle Assyrian texts of coats in the two dyed wools sīg-za-gìn-gi₆ and sīg-za-gìn-sa₅.

2.2. Wool allocations

In two cases, wool forms a component of a mixed consignment of commodities known as a *šazbussu*.⁸³ These are mainly foodstuffs and the consignment is obviously intended as a kind of subsistence package provided by the administration for persons working for it. Similar is SAA 11.28:13 where 6 ma-na sīg-meš is listed among other contributions probably intended to support a person or persons performing *ilku* duties, after garments and before *sāgu* and sandals. It is not stated what purpose the wool would have served: it could hardly have been intended that the soldiers or officials receiving these commodities would have had the opportunity, time or skill to convert the wool into a woven fabric (or indeed felt). Conceivably therefore it was intended as packing material for a pillow or as a stock of spun wool for mending torn or worn garments.

3. Middle Assyrian textile terminology

Since we are concerned primarily with wool, I have not attempted to carry out a study of the Middle Assyrian textile industry, which of course also included linen. However, since the Middle Assyrian sources are not represented in the previous volume⁸⁴ it may be helpful to include here a list of words for articles of clothing and other textile products I have noted in the Middle Assyrian sources, with occasional translations or at least approximate meanings. A more substantial study would be a major undertaking, requiring comparison with other textual groups, such as the texts in Middle Babylonian dialect from south Mesopotamia, Nuzi, and Syria where some of the same terms recur, although not a few of them are unique to Middle Assyrian texts at present.

Akkadian	logogram	number	total weight in minas	unit weight	source
^u eg-a-la-ZI-a		1	12	12 minas	Röllig 2002.12:11
^u eg-išhanabe		1	10	10 minas	Röllig 2002.12:10
kubšu	túg-sagšu	6	2	20 shekels	MARV 3.5.38'
kusītu	túg-bar-dul	2	8	4 minas	Röllig 2002.12:7
lubbēru		3	31.5	10.5 minas	Frahm 2002, 80
lu-be-ri a-la-ZI-a-e		3	30	10 minas	Tell Ali No. 23
^u eg-mašhuru		6	36	6 minas	Röllig 2002.12:17–18
		5	15	3 minas	Röllig 2002.12:5
		15	90	6 minas	Tell Ali No. 23
naḥlaptu	túg-gú-è	1	9	9 minas	MARV 3.5.16'
subātu (?)	túg-ḥi-a	1	7 or 10	7 or 10 minas	Röllig 2002.12:1–4
subātu ša šipri		1	3	3 minas	MARV 3.5.28'
^u egša batten		1	12	12 minas	Tell Ali No. 23
šaḥarrātu		3	1	20 shekels	MARV 3.5.32'

Table 20.1. *Weights of textiles*

One research procedure which offers some prospect of progress would be to assemble the evidence of the weights of different types of textile. Table 20.1 takes a first step in this direction. Damage to some of the texts involved has greatly reduced the precise information which might otherwise have been available. In particular the tablet MAH 15854 (Aššur 2/iv, 2), with the phrase [x ma-na]-ta-àm *up-pu-ša* ‘manufactured [at x minas (of wool)] each’ would have given us precious data for garments including *kindabašše*, *išhanabeâte*, and *miḥši* if the left side were not missing. Likewise, MARV 3.5 is less helpful than appears at first sight, because it is not evident whether the weight in minas stated in the first line of each section applies solely to the first entry, or to all the textiles listed in the section; hence the 9 minas indicated for *naḥlaptu* in Table 20.1 is not 100% certain. That section (MARV 3.5:16'–24') also gives subsidiary weights of 2/3 of a mina and 15 shekels for component parts like sleeves and breasts, which further complicates the position. Finally, at Dūr-katlimmu we have the problem that some of the *mašhuru* required 3, but others 6 minas, so that it remains unclear whether the ‘garments’ (túg-ḥi-a) to be manufactured alongside them by women receiving 13 minas each would have used up 7 or 10 minas.

It should be possible to arrange a list of different items in accordance with their average weight – obviously a pair of socks is likely to weigh less than a tapestry – and the approximate metric equivalents should also help to support identifications proposed on other grounds. For the time being however, my work has not progressed beyond the assemblage of data given below, which should be placed alongside the very useful list drawn up for Middle Babylonian texts by J. Aro.⁸⁵

3.1 Terms related to textiles and garments

ahātu ‘(pair of) sleeves’⁸⁶

The word in this form is a plural but refers to a pair of sleeves as is shown by the use of *iltēniātu* where a single pair is meant,⁸⁷ or *ana šinišu* for two.⁸⁸ A text from Babu-aḥa-iddina’s archives records “2 robes? with cedar decoration, with sleeves; 1 robe? with crossed animal decoration, without sleeves”.⁸⁹ MARV 3.5:17’ lists a coat (*naḥlaptu*) of red wool “with sleeves (á-meš) and breasts (of) 2/3 minas of red wool”.⁹⁰ This needs to be compared with MARV 1.24:13’ which has “1 coat of red wool, with breasts (and?) sleeves...”⁹¹ and also MAH 16086 A.i.2 (Aššur 2/iv) which now can be seen to have read g]ab-meš á-meš šá *ab-ba-še*, although in both passages the meaning remains uncertain.

alaziyu ‘Cypriot’

This apparently geographical epithet qualifies *lubēru* (q.v.) at Tell Ali,⁹² and appears as an independent substantive at Dūr-katlimmu.⁹³ Since they are both relatively heavy items (10 or 12 minas), it is possible that the Dūr-katlimmu garment was also a *lubēru*. The term ‘Alašian’ must of course refer to the style, not the physical origin, of the garment, since in each case it is being manufactured by the palace work-force.

a’lu (a band, sash?)⁹⁴

One Amarna passage has *i-li* which is presumably the reason why CAD opts to transcribe *i’lu*, but the variant Assyrian writings suggest *ia’lu*,⁹⁵ or *a’lu*⁹⁶ or just *alu*.⁹⁷ The Practical Vocabulary of Aššur offers the logogram *túg-sig₄-za*.⁹⁸ See in addition Aro 1970, 24 citing an entry 1 *túg-gú-è i’lum* which shows the same association with a *naḥlaptu* as we find in MARV 3.5:26’ [1] *túg-gú-è šá a’li*. MARV 10.82:1 rather hints that 20 *ia-a’lu-meš* belonged with 10 garments (*túg-ḫi-a-meš*), and this too may indicate that they were supplementary items often accompanying an entire garment, such as a belt or sash of some kind. The dictionaries assume that the word is cognate with *e’ēlu* (Ass. *e’ālu*) ‘to bind’ and so AHW suggests ‘eine Binde’.

aššianu (meaning unknown) CAD A/iī, 465 s.v. *aššianu*

Found once in Tušratta’s correspondence, and frequently at Nuzi. In Assyria it is attested twice in Babu-aḥa-iddina’s archive,⁹⁹ once in an Aššur textile record (Aššur 2/iv, p. 5), and once in MARV 10.69:1 [x] *túg a-ši-a-nu^{meš}*.¹⁰⁰ These instances do not support, but perhaps do not rule out CAD’s meaning: (a decoration sewn on garments).

biršu ‘rug’¹⁰¹

The CAD entry suggests ‘woolen fabric with raised nap’ probably referring to blankets. The sole Middle Assyrian administrative context is KAV 99:18 1 *túg-ḫi-a bi-ir-ša er-qa ša-ú-pa*. AHW’s proposal ‘eine Art von Filz’ seems less likely now that *taḥapšu* is fairly certainly felt.

ḫullannu, pl. *ḫullannātu* (a luxury garment)¹⁰²

Some passages in Nuzi texts suggest it came in pairs: *iltēnnūtu ḫullannu* ‘a single set of ḫ.’ and 4 *tapala ḫullannu* ‘4 pairs of ḫ.’¹⁰³ AfO 19, Taf. 6 mentions “2 ḫ. with cedar (decoration), with sleeves; 1 ḫ. with crossed animal (decoration), without sleeves”, making it clear that these were luxury items.¹⁰⁴ Since they have sleeves they presumably clothed the upper body in some way, but I see no way of telling

whether these were shorter, i.e. ‘tunics’, or longer, e.g. ‘gowns’, or some variant shape which was more obviously double.

išhanabe, pl. *išhanabeēte* (meaning unknown)¹⁰⁵

Known in Babylonia,¹⁰⁶ and quite frequently mentioned in Assyria, sometimes of coloured fabric. Garments of this type manufactured under the *iškāru* work-assignment system in Babu-aḥa-iddina’s workshops for export to the west (Canaan KUR *ki-na-ḥi*) are described as having a ‘white *sūnu*’.¹⁰⁷ At Dūr-katlimmu 10 minas (5 kg) of wool are allocated for the manufacture of one *išhanabe*.¹⁰⁸

kindabaššu ‘loincloth’¹⁰⁹

Referred to in the harem edicts, where the context suggests an intimate piece of apparel, and attested in the Babu-aḥa-iddina household¹¹⁰ and the Aššur textile records.¹¹¹

kubšu = (TÚG.)SAGŠU ‘headdress’¹¹²

Despite the qualms of Freydank¹¹³ this must be the reading in some Middle Assyrian texts of the apparent *túg-ugu* (i.e. U+KA rather than U+SAG). This headgear can be white,¹¹⁴ and made of felt.¹¹⁵ Presented to a dragoman.¹¹⁶

kuddilu (meaning unknown)¹¹⁷

Kept in hampers (*quppu*) in Urad-Šerua’s storerooms¹¹⁸ and in chests (*tupninu*) in the Babu-aḥa-iddina archive.¹¹⁹ From the instruction in KAV 200 rev. 2–4 we might be entitled to see *kuddilu* as a generic term for ‘clothing’ or ‘textiles’: “Out of the hamper of ku[dd]ilu from the previous linen (garments) extract one linen garment, either a coat or a big robe!”¹²⁰

kušitu (*túg-bar-dul*) ‘robe’¹²¹

Like *išhanabe* these were manufactured in Babu-aḥa-iddina’s workshops for export, again by Siqi-ilani (see under *išhanabe*),¹²² listed among the products of the state textile workshop at Dūr-katlimmu,¹²³ and also produced for the state under the *iškāru* work-assignment system.¹²⁴ At Dūrkatlimmu 8 minas (4 kg) wool were needed for 2 *kušitu*.¹²⁵

lippu ‘wrap’ or ‘roll’?¹²⁶

These are purely hypothetical alternative translations based on the assumption that the word derives from the same root as *lapāpu* ‘to wrap, roll up’. Once again, it is attested in the Babu-aḥa-iddina archive¹²⁷ and in the Aššur textile texts.¹²⁸ A meaning like ‘roll’ makes it easier to understand how the scribes recorded ‘2½ *lippu*’: half of a roll of cloth is more likely to be recorded than half of a garment.¹²⁹ This term may be followed by *ša bir-me* ‘of coloured fabric(?)’, perhaps referring to a roll of decorative trimming,¹³⁰ but note that *ša bir-me* may also follow *naḥlaptu*, where this precise nuance would not work.

lubēru (a ceremonial garment)¹³¹

KAJ 256:1 lists 2 and Iraq 35 T. 13 1:22, both from the Babu-aḥa-iddina archive, lists 1 TÚG *lu-be-ru ša ni-qi-a-te* ‘of sacrifices’ so that this item was apparently sometimes used in ritual procedures. It was a substantial garment because at Tell Ali we read that 30 minas of wool were allocated for the manufacture of 3 ‘Cypriot *lubēru*’.¹³² A text from the Stewards’ archive at Aššur apparently records the issue of three *lubēru* to be dyed *takiltu* colour; they weighed in total 31½ minas, very like those mentioned at Atmannu.¹³³ An ‘Assyrian *lubēru* survived into the 1st

millennium.¹³⁴

lubultu ‘clothing’

A generic term for clothing, found in various contexts including Tell Ali and Dūr-katlimmu. Sometimes contrasted at Atmannu and Dūr-katlimmu with the work clothing (*mašḫuru*).

maklulu (a garment) CAD M/i, 137b s.v. ‘maklalu’

This is an article of clothing, better attested in Neo-Assyrian texts.¹³⁵ In MARV 1.24:7’ it appears to be ‘for work’ (ša kin), and to be of some technique or workmanship which is lost at the broken end of the line.¹³⁶ In KAV 99 from the Babu-aḥa-iddina archive we have “two work garments of the countryside, together with their *maklulu*”,¹³⁷ suggesting that it could be an ancillary item, conceivably ‘hood’ (given the association of the root *kll* with headgear in other words).¹³⁸

mardutu ‘tapestry, carpet’¹³⁹

The best attested Middle Assyrian attestations of this word are in MARV 3.8¹⁴⁰ and the inventory text from Kār-Tukultī-Ninurta,¹⁴¹ where the decorative designs on tapestries are described and two types are listed: ‘knotter’s work’ and ‘weaver’s work’, which we presume refer to pile carpets and woven kilims respectively (see above, pp. 407–408).

mašḫuru (a work garment) not in the dictionaries

Not apparently attested in other dialects,¹⁴² this word refers to a garment regularly produced by state weaving establishments at Atmannu (Tell Ali),¹⁴³ Dūr-katlimmu¹⁴⁴ and at Aššur¹⁴⁵ as working clothes for their dependent employees. See the comment in an Aššur document “Total: 7 *mašḫuru*-women ... they will make 24 *mašḫuru* and will clothe 24 work-men”;¹⁴⁶ compare ‘the women who make *mašḫuru* garments’ from Dūr-katlimmu.¹⁴⁷ Tell Ali No. 23 implies that 1.5 talents (45 kg) of wool will suffice for 15 *mašḫuru*, hence each garment requires 6 minas or 3 kg.¹⁴⁸ This may have been normal, as a Dūr-katlimmu list implies that some *mašḫuru* could require only 3 minas,¹⁴⁹ but the same text later on appears to list issues of 6 minas per *mašḫuru* (No. 12:17–20).

miḫṣu (meaning uncertain) CAD M/ii, 62 under 9. ‘woven cloth’ (no MA refs.)

To judge from Babylonian usage, this was a textile which could be of coloured wool, and although it may etymologically mean no more than ‘textile’ (*maḫāṣu* = ‘to weave’), it had a distinct identity as emerges from MAH 15854.A.9’ where amounts of wool and the resultant number of textiles were listed:]a-na 27 tūg *mi-iḫ-ši* [x]-ta-ām *up-pu-ša* (Aššur 2/iv, p. 2). The only other passage I have noted from MA Aššur is the unhelpful entry: MARV 7.23:5’ (*i+na mi-iḫ-ṣ[i?]*).

naḥlaptu (tūg-gú-è) ‘coat’¹⁵⁰

Once probably written syllabically *na-ḥa-áp-tu*, suggesting a form *naḥḥaptu* which is also attested twice in Neo-Assyrian.¹⁵¹ This is the most frequently mentioned garment, occurring in a variety of contexts, and is found in contemporary Babylonia and later Assyria. I translate ‘coat’ rather than ‘cloak’ because in English today a cloak has no sleeves, and we know that in Middle Assyrian parlance it could have both ‘breasts’ (gab-meš) and ‘arms’ (á-meš).¹⁵²

Some were in dyed wool (ša *ṣir-pi*¹⁵³), some in specific colours,¹⁵⁴ some ‘white’.¹⁵⁵ The House of Puḫunu had a work-assignment (*iškāru*, perhaps imposed on it by the state) comprising some coloured and some white coats.¹⁵⁶ The textile

work-assignment lists from Aššur mention ‘battle coats’ (*ša gaz-meš*), which were usually *ša’upu*, possibly ‘embroidered’(?) and *qatnu* (‘fine’), and ‘2nd class coats’ which were *ša bir-me* (with coloured trim(?), see above).¹⁵⁷ In the Aššur lists there is also ‘a coat with a sash?’.¹⁵⁸ From KAJ 279:6–9 it is clear that women also wore these coats.¹⁵⁹ Women workers at Dür-katlimmu are listed as receiving wool to manufacture ‘coats’ and *túgša-ba-ta-te*,¹⁶⁰ and MARV 10.5 appears to list more than 100 coats or components of coats.¹⁶¹ In a legal document from Giricano on the northern frontier 6 coats and 4 *niksu* textiles are specified as a substitute payment for a slave.¹⁶²

nakbusu ‘mat’ of a chariot¹⁶³

Literally what one treads on, hence a mat.¹⁶⁴ Included among the work-assignments at Aššur.¹⁶⁵ MARV 10.3:17–18 lists a chariot without a mat (*la-a na-ak-bu-su*). Already found in chariots at Mari.¹⁶⁶

nēbuḫu (*túg-īb-lá*) ‘belt, girdle’ CAD N/ii, 143 s.v. *nēbeḫu* A

MARV 10.3 listed a (lost) number of belts in ‘red wool’ (*síg-sa₅*) and 45 ‘white’ ones. Two lots of 6 and 34 belts for different purposes are listed in MARV 10.69:4–5. A letter from Babu-aḫa-iddina to his household staff seems to mention a belt (*túg-īb-lá*) in a context associated with the Hittite king.¹⁶⁷

niksu (a garment)

Not recognized in CAD N/ii, 231 s.v. *niksu*, but one Middle Assyrian and several Neo-Assyrian occurrences of a textile called this were noted by Deller.¹⁶⁸ That it was a definite type of garment (rather than a general ‘off-cut’) follows from the Middle Assyrian examples of *túg_{ni}-ik-su* listed in MARV 1.24 along with quantities of coloured wool and other pieces of clothing, which are all summed up as ‘good quality clothing’ (*lubultu sig₅-tu*).¹⁶⁹ One additional Middle Assyrian passage from Aššur does little to improve our understanding of its nature,¹⁷⁰ and the same goes for a mention on the northern frontier at Giricano, where 6 coats and 4 *niksu* are mentioned as the ‘price’ of releasing a man from service.¹⁷¹

paršigu (a headdress?)¹⁷²

túg?-bar-si-ig [(x)] in a badly damaged letter from Tell Billa,¹⁷³ if correctly read, was presumably some form of headgear related to the Babylonian term *paršigu* loaned from Sumerian.

(*túg*) *qutiū* ‘Gutian (textile)’ not in the dictionaries

So far attested just once in the Babu-aḫa-iddina archive: 1 *túg qu-ti-ú*.¹⁷⁴

siraḫ

Only known to me from the entry [x *túg*] *si-ra-aḫ*.¹⁷⁵ Perhaps to be identified with Middle Babylonian *siṛaḫ*,¹⁷⁶ a term which is sometimes associated with *naḫlaptu* ‘coat’.

sīru (meaning unknown) AHW 1050b has an Old Assyrian and Old Babylonian *sīrum* with the meaning ‘tent’¹⁷⁷

A textile of some kind, to judge from the determinative *túg*. Attested twice in the MARV 10 texts from the Stewards’archive (Ass. 21101), but without any clear grounds to support or refute the meaning ‘tent’.¹⁷⁸ Whether there is any connection with the enigmatic word *siruribu* (see below) is uncertain.

(*túg*) *suḫāiu* ‘Suhian (garment)’ not in the dictionaries

So far attested once from Atmannu, where it is listed alongside *mašhuru* as the destination of 1 talent 10 minas of wool, and in a tablet from Tell Taban.¹⁷⁹

sūnu ‘(part of garment)’ [úr]¹⁸⁰

In Middle Assyrian texts, as also in Nuzi and Kassite Babylonia¹⁸¹ this item is often a component of another garment, e.g. 1 *túg iš-ḥa-na-be ša úr babbar* ‘with a white *sūnu*’.¹⁸² In the Aššur textile lists the *ašianu* garment occurs ‘together with its *sūnu*’,¹⁸³ and in one case we have a 2 *ša tusaḥḥuri a-di úr-meš-šu-nu*. ‘2 wrappings together with their *sūnu*’. See Dalley 1980, 72–73 for a meaning like ‘trimming’ which seems well suited to the Middle Assyrian occurrences. A. 1722 from the Babu-aḥa-iddina archive records “2 garments with *sūnu* of *takiltu*-wool”;¹⁸⁴ at Nuzi it could be in blue wool (*uqnāti* CAD 390a) and in Mittani multi-coloured (*gùn-a* = *burrumu*?).

šipirtu (a kind of rug or blanket)¹⁸⁵

A textile used on the palace beds at Atmannu.¹⁸⁶ In the Neo-Assyrian period it is once associated with a chair or stool (SAA 7.120.ii.12) and so it seems unlikely to mean ‘scarf’.¹⁸⁷

šubātu ‘garment’ [= *túg-ḥi-a*]

túg is conventionally equated with *šubātu*, *túg-ḥi-a* with *lubāru* see CAD Š, 225 and L, 231. However it seems possible that Donbaz 1991 Ass. 1722:1–2 2 *túg šu-ba-tu* gives us a syllabic writing of *túg-ḥi-a*, and occurrences of this logogram are included here. The widest range of this class of garment is offered us by VAT 8236:5–12 from the Babu-aḥa-iddina archive:¹⁸⁸

- 1 *túg-ḥi-a* [kī]-in-da-ba-š[e]
- 2 *túg-ḥi-a qa-at-nu síg-za-g[īn (sa₅)]*
- 1 *túg-ḥi-a* [q]a-at-nu síg-za-gīn gi₆ qa-ti-ip
- 1 *túg-ḥi-a qa-at-nu sa-ú-pu ša úr gi-im-ri*
- 1 *túg-ḥi-a tu-tu-pu* [ša úr x[...]]

This does suggest that even if standing on its own it can have a more specific meaning, it retains the general meaning of ‘garment’ which included a variety of different types. There are two examples of ‘work garments’ (*túg-ḥi-a ša šipri*).¹⁸⁹ Two ‘garments’ and two carpets (*mardutu*) are mentioned together in MARV 3.8:35, and ‘10 garments and 20 sashes?’ (see under *a’lu* above) in MARV 10.82.¹⁹⁰

ša batten (meaning unknown) CAD Š/i, p. 8 s.v. *šabattu*

In Middle Assyrian the singular form of this term is *ša batten*, presumably meaning something like ‘of two sides’. In Tell Ali No. 23 12 minas (6 kg) of wool are allocated for a *ša batten*,¹⁹¹ and at Aššur the manufacture of this item was organized by work-allocation (*iškāru*).¹⁹² The plural form is *ša battâte*.¹⁹³ At Dūr-katlimmu wool is issued to women who “are making 60 [or 1?] *ša battâte* and 60 [or 1?] coats”.¹⁹⁴ From the Babu-aḥa-iddina archive we have a mention of “7 large leather cases(?) for *ša battâte*” which should offer some clue to their nature, though not one I can solve.¹⁹⁵

šaḥarrātu ‘leggings(?)’ CAD Š/i, p. 81 s.v. *šaḥartu*; AHw 1129a

An item of apparel coming in pairs, found in the Aššur textile lists.¹⁹⁶ This word is also encountered in Neo-Assyrian texts, see SAA 7, p. xxix, suggesting ‘socks’ or ‘leggings’, and this fits well enough with the Middle Assyrian attestations. One pair in MAH 16086 is associated with ‘the king’s feet’,¹⁹⁷ and the term is found

immediately before boots (*šuḥuppāte*) in the Harem Edicts.¹⁹⁸ 1 mina of wool is allocated for 3 white pairs.¹⁹⁹

ša tusaḥḥuri ‘wrapping’(?) not in the dictionaries

This term, employing the Dtn infinitive of *saḥāru* ‘to encircle’ is possibly some kind of protective clothing wound round the body or a limb. It is listed in an Aššur work-assignment text, and described as white, with *sūnus* (see below), and with the additional qualification *ša ud-meš*, perhaps ‘for everyday wear’?²⁰⁰

tuttubu (a garment) CAD T, 498 s.v. *tuttubû* (a cloak)

Attested once in the Babu-aḥa-iddina archive qualifying *túg-ḥi-a* (see above s.v. *ṣubātu*). Perhaps, though not certainly, to be assigned to *tuttubû* which is well known at Nuzi.

3.2 Qualifications and associated terms

birmu (coloured trimming)?; see above, p. 410.

bētu (meaning unclear)

See Aššur 2/iv, 5 for the term *é-ḥi-a* qualifying *lippu*. A connection with a term *bittum* attested at Mari²⁰¹ seems unlikely, and its meaning in this context remains obscure.

erqu ‘green?, yellow?’ CAD A/ii, 300 s.v. *arqu* 1 c); AHw 1471a s.v. (w)*arqu(m)*

To my knowledge attested only in 1 *túgbi-ir-ša er-qa ṣa-ú-pa* KAV 99.18.

karu’u (meaning unknown)

Qualifies wool in two Tell Ali texts, possibly a substantive meaning ‘short (wool)’; see above, p. 405.

maš-qi-ri (meaning unknown)

Only attested in MAH 16086 and there in disconnected contexts.²⁰²

mašru ‘teaselled’(?)

Qualification of various textiles in the Aššur lists. The translation assumes derivation from *mašāru* ‘to drag’ see Aššur 2/iv, p. 6.

nišḫu (meaning unknown)

At Atmannu in text No. 16, see above, p. 400.

qatnu (sig) ‘fine, thin’

under *ṣubātu* above). Written sig(-meš) in the Aššur list MAH 16086, where it qualifies *naḥlapātu*.²⁰³

qatpu ‘trimmed’

In the Babu-aḥa-iddina archive, see under *ṣubātu* above.

siru(-)ribu meaning unknown

Aššur 2/iv, p. 6, qualifying *ašianu*. Compare perhaps MARV 3.5:1 x *túg-ḥi-a si-ru*[...].

ša’upu ‘embroidered’(?), so AHw 1112 s.v. *šuppu I* ‘etwa bestickt’

In the Babu-aḥa-iddina archive of a ‘thin garment’,²⁰⁴ and in the Aššur textile list mostly applying to *naḥlapātu*.²⁰⁵ Also qualifying *biršu* in KAV 99 (see above under *biršu*). As noted there, there is no certainty about this translation.

ša dīkati (wr. gaz-meš) ‘for combat’

Qualifying *naḥlaptu* in the Aššur textile list MAH 16086.²⁰⁶

ša ki lē'i 'in accordance with the writing board'

This is not a qualification of a textile in the normal sense, but is included here to enable me to correct the incorrect entry *ša ki-li-ḫi ša* PN in *Aššur* 2/iv, 7. The correct interpretation of this phrase as *ša ki lē'i* was provided by Freydank MARV 3, p. 9 in the light of the passage *ša pi-i le-ṛi ša é-gallim* MARV 3.5:36'. It shows that the work assignment system was organized on the basis of lists maintained by the administration on writing-boards which were doubtless referred to year after year.

ša šipri (wr. *kin*) 'for work'

Applied to *šubātu* (túg-ḫi-a),²⁰⁷ and to *maklulu*.²⁰⁸

ša ud-meš 'for everyday (use)'(?)

Meaning quite uncertain.²⁰⁹

šingu (a qualification of wool)

This word sometimes appears after the logogram for wool (*síg*) and sometimes standing on its own (see above, pp. 405–406, for examples from Aššur, Tell Ali and Tell Taban). Neither etymology nor context suggests any obvious meaning for this term, but it probably refers to a quality of wool.

zizziqtu 'fringe, hem' (Babylonian *sissiqtu*)

The writing with *z* in place of Babylonian *s* agrees with the Neo-Assyrian form of the word as attested in the Practical Vocabulary of Aššur,²¹⁰ and ABL 620 r. 16 *túg zi-zi-iq-tú*, while *[zi-zi-qa-tu-šu-n[u in MARV 3.8:rev.25'* reveals the emphatic velar, and suggests that in Babylonian we should normalize *sissiqtu* (from */siqsiqtu/*).²¹¹ As a separate item mentioned once in the Stewards' Archive pab 5 *túg-zi-zíq-[x]* MARV 10.54:10.

Bibliography

AfOArchiv für Orientforschung

AHW. von Soden, *Akkadisches Handwörterbuch*.

AOAlter Orient und Altes Testament.

AoAltorientalische Forschungen

CADThe Assyrian Dictionary (Chicago)

JCSJournal of Cuneiform Studies

JSSJournal of Semitic Studies

KAKeilschrifttexte aus Aššur Juristischen Inhalts

KAWKeilschrifttexte aus Aššur Verschiedenen Inhalts

MAHglum for tablets in the Musée d'Art et d'Histoire, Geneva

MARVFreydank, *Mittelassyrische Rechtsurkunden und Verwaltungstexte*. Berlin/Wiesbaden

MARV 1 = VS 19/NF3

MARV 2 = VS 21/NF5

MARV 3 = WVDOG 92

MARV 4 = WVDOG 99

MARV 5 = WVDOG 106

MARV 6 = WVDOG 109

MARV 7 = WVDOG 111

MARV 8 = WVDOG 119

MARV 9 = WVDOG 125

MARV 10 = WVDOG 134 (for edition, see Prechel and Freydank 2014).

MARV 5–9 with B. Feller, MARV 10 with D. Prechel.

MDMGteilungen der Deutschen Orient-Gesellschaft

SA State Archives of Assyria
 SAB State Archives of Assyria Bulletin
 SCCNH Studies on the Civilization and Culture of Nuzi and the Hurrians
 TR siglum for texts from Tell al-Rimah
 VACatalogue number of tablets in the Vorderasiatisches Museum, Berlin.
 VSVorderasiatische Schriftdenkmäler
 WVWissenschaftliche Veröffentlichungen der Deutschen Orient-Gesellschaft

Bibliography

- Aro, J. (1970) *Mittelbabylonische Kleidertexte der Hilprecht-Sammlung Jena*. Berlin.
- Cancik-Kirschbaum, E. C. (1999) *lūšāpi'u/sēpū*. Eine akkadische Berufsbezeichnung aus dem Bereich der Textilherstellung. In B. Böck, E. Cancik-Kirschbaum, and T. Richter (eds), *Munuscula Mesopotamica. Festschrift für Johannes Renger* (AOAT 267), 79–93.
- Curtis, J. E. and Green, A. R. (1997) *Excavations at Khirbet Hatuniyeh*. London.
- Dalley, S. M. (1980) Old Babylonian Dowries. *Iraq* 42, 53–74.
- Dalley, S. M. (1996–97) Neo-Assyrian Tablets from Til Barsib. *Abr-Nahrain* 34, 66–99.
- Dalley, S. M. (2000) Hebrew *taḥaš*, Akkadian *duḥšu*, Faience and Beadwork. *JSS* 45, 1–19.
- Deller, K. (1987a) Akkadische Lexicographie: CAD N, I. Neu- und Mittellassyrisch and II. Nuzi. *Orientalia* 56, 177–195.
- Deller, K. (1987b) Review of MARV 2. *Afo* 34, 58–66.
- Donbaz, V. (1988) Some Complementary Data on some Assyrian Terms. *JCS* 40, 69–80.
- Donbaz, V. (1991) The Date of the Eponym Nabû-bēla-ušur. In D. Charpin and F. Joannès (eds), *Marchands, diplomates et empereurs, Etudes sur la civilisation mésopotamienne offertes à Paul Garelli*, 73–80. Paris.
- Donbaz, V. (1997) Bābu-aḥa-iddina's Archive in Istanbul, *Archivum Anatolicum* 3, 101–9.
- Durand, J.-M. (2009) *La Nomenclature des habits et des textiles dans les textes de Mari* (Archives Royales de Mari XXX: Matériaux pour le Dictionnaire de Babylonien de Paris, Tome 1).
- Edel, E. (1992) GAD.TÚG *mak-la-lu* gleich *jdg*, etwa 'Mantel, Umhang'. In H. Otten, E. Akurgal, H. Ertem, A. Süel (eds), *Hittite and other Anatolian and Near Eastern Studies in honour of Sedat Alp*, 127–135. Ankara.
- Faist, B. (2001) *Der Fernhandel des assyrischen Reiches zwischen dem 14. und 11. Jh. v. Chr.* (AOAT 265).
- Frahm, E. (2002) Aššur 2001: Die Schriftfunde. *MDOG* 134, 47–85.
- Freydank, H. and C. Saporetti (1989) *Bābu-aḥa-iddina. Die Texte*. Rome.
- Goetze, A. (1956) The Inventory IBoT I 31. *JCS* 10, 32–38.
- Ismail, B. Kh. and Postgate, J. N. (2008) A Middle Assyrian Flock-master's Archive from Tell Ali. *Iraq* 70, 147–178.
- Jakob, S. (2003) *Mittellassyrische Verwaltung und Sozialstruktur. Untersuchungen*. Leiden.
- Köcher, F. (1957–8) Ein Inventartext aus Kār-Tukulti-Ninurta. *Afo* 18, 300–13.
- Landsberger, B. (1967) Über Farben im sumerisch-akkadischen. *JCS* 21, 139–173.
- Landsberger, B. and Gurney, O. R. (1957–8) Practical Vocabulary of Aššur. *Afo* 18, 328–341.
- Larsen, A.W. (2010) Tools, Procedures and Professions: A Review of the Akkadian Textile Terminology. In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 272–282. Ancient Textile Series 8. Oxford.
- Lion, B. and Sauvage, M. (2005) Les Textes de Nuzi relatifs aux briques. *SCCNH* 15, 57–100.
- Michel, C. (1998) Les Mites de l'Assyrie. Moths in the Assyrian Texts of the Second Millennium BC, *JAOS* 118, 325–331.
- Michel, C. and Nosch, M.-L. (eds) (2010) *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*. Ancient Textiles Series 8. Oxford.
- Orthmann, W. ed. (1975) *Der alte Orient* (Propyläen Kunstgeschichte).
- Postgate, J. N. (1979) Assyrian Documents in the Musée d'Art et d'Histoire. Geneva, *Aššur* 2/iv.
- Postgate, J. N. (2000) Assyrian Felt. In P. Negri Scafa and P. Gentili (eds), *Donum Natalicium: Studi in onore di Claudio Saporetti in occasione del suo 60° compleanno*, 213–217. Rome.
- Postgate, J. N. (2001) Assyrian Uniforms. In W. van Soldt (ed.), *Veenhof Anniversary Volume*, 373–388. Leiden.

- Postgate, J. N. (2012) Assyrian Percentages? Calculating the Birth-rate at Dur-katlimmu. In G. B. Lanfranchi, D. Morandi Bonacossi, C. Pappi and S. Ponchia (eds), *Leggo! Studies Presented to Frederick Mario Fales on the Occasion of his 65th Birthday*. 677–685. Wiesbaden.
- Postgate, J. N. (2013) *Bronze Age Bureaucracy: Writing and the Practice of Government in Assyria*. Cambridge.
- Postgate, J. N. and Collon, D. (1999–2001) More Stray Aššur Tablets. *SAAB* 13, 1–16.
- Prechel, D. and Freydank, H. (2014) *Urkunden der königlichen Palastverwalter vom Ende des 2. Jt. v. Chr.* (Studien zu den Assur-Texten 5). Wiesbaden.
- Radner, K. (2004) *Das mittellassyrische Tontafelarchiv von Giricano/Dunnu-ša-Uzibi* (Subartu XIV). Brepols.
- Röllig, W. (2002) Aus der Kleiderkammer einer mittellassyrischen Palastverwaltung mašhuru-Kleider. In O. Loretz, K. A. Metzler and H. Schaudig (eds), *Ex Mesopotamia et Syria Lux. Festschrift für Manfred Dietrich*, 581–594. AOAT 281.
- Röllig, W. (2008) *Land- und Viehwirtschaft am Unteren Hābūr in mittellassyrischer Zeit*. Berichte der Ausgrabung Tell Šēh Ḥamad/Dūr-katlimmu, Band 9, Texte 3. Wiesbaden.
- Rouault, O. (1977) L'approvisionnement et la circulation de la laine à Mari. *Iraq* 39, 147–154.
- Stol, M. (1980–83) Leder (industrie). *Reallexikon der Assyriologie* VI, 527–543.
- Tsukimoto, A. (1992) Aus einer japanischen Privatsammlung: Drei Verwaltungstexte und ein Brief aus mittellassyrischer Zeit. *Die Welt des Orients* 23, 21–38.
- Villard, P. (2010) Les textiles néo-assyriens et leurs couleurs. In C. Michel and M.-L. Nosch (eds) *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 388–399. Textile Series 8. Oxford.
- Weidner, E. F. (1954–6) Hof- und Harems-Erlasse assyrischer Könige aus den 2. Jahrtausend v. Chr. *Afo* 17, 257–293.
- Weidner, E. F. (1959–60) Der Kanzler Salmanassars I. *Afo* 19, 33–39.
- Whiting, R. M. (1988) A Late Middle Assyrian Tablet from North Syria. *SAAB* 2/ii, 99–102.
- Ziderman, I. (1987) First Identification of Authentic *tēkēlet*. *BASOR* 265, 25–34.

¹ Ismail and Postgate 2008.

² No. 19; probably also No. 23:21 *ša li-me* PN.

³ *Ša muhiš šiluhli*; see Ismail and Postgate 2008, 151.

⁴ Röllig 2008 No. 48:31–34, *iš-tu* 4 gú-un 49 ma-na sīg-meš, *a-na* giš-gàr-meš *ù lu-bu-ul-te*, *a-na* géme-meš *é-galim ta-a[d-nu-ni]*, 14 gú-un sīg-meš *r[e-eh-tu...]*.

⁵ Röllig 2008 No. 51:3–6, *[(i)š-[t]u* 30 gú-un 36 ma-na *a-na* giš-gàr kimin (= *ù*) *lu-bu-ul-te*, *a-na* géme *é-galim ta-ad-na-ni* 8 gú-un 9 ma-na sīg, *i + na qa-ti-šu* 2 gú-un 25 ma-na *šar-tu*, 5 bān 5 *qa i-nun i + na qa-ti-šu-ma*. The transliteration agrees with Röllig's hand-copy, rather than his edition, which takes the final vertical of *tu* as standing for 60. I am very grateful to C. Michel for pointing out that the resulting amount of wool would have implied that more than 4 kg came from each animal, and the revised figure giving 960 kg here (and about 1200 kg if we include the remainder) indicates approximately 2 kg per animal which is more plausible.

⁶ Cf. Tell Ali text No. 2 which also includes the goat-hair and butter in a flock count.

⁷ Röllig 2002, No. 12.

⁸ For more detail see Postgate 2013.

⁹ MARV 3.5 bears the excavation number Ass. 14466, the provenance of which is not known to me.

¹⁰ MAH 16086, Postgate 1979.

¹¹ MARV 3.5:40'–42', giš-gàr-meš *ša ab-ba-še ša li-me* [PN].

¹² Babylonian *šipātu*, Old Assyrian *šāptu* (but once *šī-pā-ti* see CAD Š/iii.57). Middle Assyrian usually written sīg or sīg-meš, feminine plural (cf. sīg *an-na-tu* in KAJ 211); syllabic: *šar-tu šī-pa-tu tab-ri-bu* 'hair, wool, dyed wool' (MARV 10.23:7).

¹³ Deller 1987b, 62–3.

¹⁴ Cancik-Kirschbaum 1999; Postgate 2000. I have not checked out whether the Old Babylonian *šusikkum* who dealt with cadavers was likewise involved in the recovery and processing of felt.

¹⁵ Cancik-Kirschbaum 1999, 92–93.

¹⁶ Cancik-Kirschbaum 1999, 93 VAT 19554:2–6, 10 gú-un sīg-meš sīg₅ *ša ša kuš udu-meš ša-ú-ru-te* udu-siskur-meš *ut-ra-te ša šu* PN. The text may read not *ša qāt* but *ša limme* (cf. Faist 2001, 89³⁶).

¹⁷ Postgate 2012, 680–682.

¹⁸ The contents of this tablet (A.1720) are adumbrated in Donbaz 1997, 107, but it is damaged and possibly the numbers of talents and minas are not preserved. A merchant named Aḫu-ṭab is known to

have had dealings with the Babu-aḥa-iddina household from the letter KAV 98. See Faist 2001 for both Babu-aḥa-iddina's textile export business and other examples of the export (p. 73) and occasional import (pp. 70–71) of textiles.

19 KAJ 111:1–7, 10 ma-na sīg-meš ša dumu-munus PN dam-at Urad-Šerua sīg an-na-tu a-na 1 lim sīg-meš i-na urutu-ša-pi a-na la-ba-ni ta-ad-na-ni-šu sīg-meš i-la-bi-in i-dan ū tup-pu-šu i-ḥap-pi.

20 Interestingly wool is also used for the remuneration of brick-workers in some Nuzi documents (see Lion and Sauvage 2005, 81–83).

21 Courtesy D. Shibata see Ismail and Postgate 2008, 168.

22 Cancik-Kirschbaum 1999, 92. It is doubtful if either of the passages cited in CAD Š/iii, 42–3 from KAJ 47 and the Esarhaddon Treaty belongs with this word.

23 Cancik-Kirschbaum 1999, 93: 10 gú-un sīg-meš sig₅ ša ša kuš udu-meš ša-ú-ru-te.

24 TR 3005: 1 1 anše 2?-bān « še » še-um 2 3 sila iā šah-giš-gi 3 3 ma-na sīg-meš 4 ša ḥu-ra-di 5 ša uruni-iḥ-ri-a 6 ša il-ka 7 iš-tu šes-meš-šu 8 i-li-ku-ni.

25 SAA 11 No. 28:13.

26 Röllig 2008, p. 198.

27 MARV 3.73:2 + envelope; MARV 10.23:7, listed between wool and dyed wool.

28 See Röllig 2008 No. 56. CAD Š/ii, 129 cites Mari and Middle Babylonian passages with sīg-ūz. The same logogram is used in the Neo-Assyrian Vassal Treaties (SAA 3.32 rev. 2; 38 rev 16C, 17C; 39:7, 13; 37 rev. 2).

29 I-na nu-pu-še ša li-me PN, rev. 6 cf. rev. 21. See on these texts (and on Old Assyrian evidence for damage caused to textiles by moths) Michel 1998, 325–327.

30 See Cancik-Kirschbaum 1999; Postgate 2000; for the furniture, cf. 10 ma-na ana giš-gu-za-meš šap-pa-la-te ša é-galim Tell Ali No. 23; also I suspect Donbaz 1988 No. 5 (A.305) mentions a *marinu ša ta-ḥap-še*! ša giš-gu-za ša lugal 14 ⅔ ma-na ki-lá “a cushion(?) of felt for the chair of the king weighing 14 ⅔ minas (~7.3 kg)” [not *ta-kil-te*].

31 Jakob 2003 (434–5; though on p. 440 he translates ‘Stäbe’).

32 Cancik-Kirschbaum 1999, 92–3.

33 Spun flax (*tf-BE-tu ša GADA*) is mentioned in large quantities (130 talents = nearly 4000 kg) at Dürkatlimmu (Cancik-Kirschbaum 1996, No. 7).

34 In the case of the knotted carpet we learn that additional detail was added by the use of coloured wools (*širpāni*), while the woven rug has a component described as *birmu*.

35 Cf. e.g. Orthmann (ed.) 1975, Abb. XVII in colour.

36 Note that this text seems to contradict the doubts expressed about Köcher's restorations by Lassen (2010, 278).

37 As also at Nuzi: see Jakob 2003, 426.

38 Jakob 2003, 425–428.

39 Cancik-Kirschbaum 1996, No. 6.

40 To Jakob's listing of weavers (2003, 412–20) we can now add the archive from Tell Ali, and a couple of male weavers at Aššur (MARV 7.72:6; 10.27:4).

41 Curtis and Green 1997, 18–19.

42 The scribe uses the D stem but this may merely be because there are plural objects. This would be = AHw's ‘šapû(m) II’. However, Landsberger 1967, 145³⁰ would reject the connection with that verb and instead presumably have seen this as the Assyrian of *šebû* ‘färben’ (and perhaps have written *šabbu'e*).

43 Frahm 2002, 80 Ass. 2001.D-2219.

44 As a verb, virtually only *-t]i ša-ra-pi* (MARV 3.8:6).

45 This is a traditional rendering of *duḥšī'u*; S. Dalley has made a plea to interpret the word as referring to a decorative surface of faience or similar beads, with accordingly a different interpretation of the profession *šārip duḥšīe*, but it does not seem to me to be a compelling case (Dalley 2000). For *t/duḥšum* qualifying wool at Mari see Durand 2009, 153–154.

46 Jakob 2003, 438 on MARV 3.77 restores a verb *da'umu* ‘schwarzfärben’ applied to leather. This appeared reasonable, but we now have *a-na da-ú-be* kuš duḥ-ši-a *i-ta-du-e ta-ad-na-šu* in MARV 10.29:13. The verb *da'ap/bu* does not otherwise seem to have any association with colour, meaning something like ‘push away’, and this may imply a different process unconnected with dyeing. Prechel and Freydank 2014 read *a-na ta-ú-be* ‘zur Verbesserung’, no doubt correctly. For another passage which might refer to dyeing leather red, see MARV 1.59:2 16 kuš máš-meš *a-na sa-u-me* ‘16 goatskins to (dye) red’, and cf. ‘red goat-skins’ MARV 10.29:19.

47 Note Ziderman 1987, 28 with footnote 7 for dyed unspun wool in the Levant.

48 MARV 10.8:1; 10.35:1.

49 After *lippu*: MARV (1), 24: 5'; Donbaz 1991. Ass 1722:5–6. After *naḥlaptu*: Aššur 2/iv MAH 16086.

After *kusiṭu*: MARV 3.5:38'. Identity of garment lost: MARV 9.102:3'.

50 Landsberger 1967, 160–161, footnote 106.

51 Neo-Assyrian: Dalley 1996–97, 79 T12:11–12 (from Til-Barsip/Tell Ahmar).

52 Stol 1980–1983, 530, §9.1–2.

53 Stol 1980–83, 534–535.

54 E.g. 2? *ma-na ḥu-ru-t[u] x ma*] na *na₄-ga-b[i-ú]* MARV 2.16:1–2; KAJ 130 (Postgate 1988 No. 24):3–4 for refurbishment of chariot; KAJ 310 (Postgate 1988 No. 50):10, 39. We hear of *abna gabīu* stored in Babu-āḥa-iddina's house: KAV 109 (No. 16):18, 20; MARV 8.67:2 appears to record a quantity of Egyptian, choice, good quality alum.

55 Donbaz 1988, 72 (cf. copy p. 80), emending to *ta-ḥap-še¹* in l. 1.

56 Giš-hab-meš *ki-mu-tu-meš*, for *qimmutu*? The root of the plant has normally been used to provide the dye, but there are also mentions of usage of the above-ground inflorescences.

57 Landsberger and Gurney 1957–58.

58 Note that MARV 10.3 has simply *śig-sa₅* as we also find in Neo-Assyrian: how this should be read and understood must provisionally remain undecided.

59 E.g. in MARV 1.24 from the Stewards' Archive.

60 The only truly Middle Assyrian syllabic writing *ta-kil-te* cited CAD T 72a from A.305 in JCS 40 is in my view probably to be emended to *ta-ḥap-še* (see above).

61 To my knowledge the logogram *śig-za-gin-kur-ra* used for *takiltu* in Babylonia (see CAD N/i, 22a; T, 70b) is not attested in Middle Assyrian.

62 Note however the Middle Babylonian occurrences of *śig-ḥé-me-da* qualified by GI₆ 'black' or 'dark?' (Aro 1970, 33).

63 See in bread lists Donbaz 1988 No. 2: 13 *ḥu-ru-ḥu-ru* and No. 1:3 14 *ḥu-ru-ḥa-ra-tu ša še-X ḥa-dš-li*. In MARV 8.21:16–17 we have *a-na šī-pār pi-ir-ki ša ḥu-ur-ḥu-ra-a-te ša a-ri-a-te*, which appears to indicate that there was a component of shields known as the *pīrku* of the *ḥurḥurāte*. Other passages are cited by Donbaz 1988.

64 Ass. 13058 hk, Donbaz 1988, No. 4, 36 *ma-na ḥu-ru-ḥa-ra-a-tu ša śig-ḥé-me-da a-na* 12 *ma-na [sī]g-ḥé-me-d[a]*.

65 SAA 7.115 r. ii.10–19, 7 *gú* 10 *ma ugu nu*, 22 *gú ḥu-ḥa-rat*, *ḥé-med a-na 3-šú*.

66 My own hunch, perhaps worthy of a footnote, is that *ḥuruḥarātu* means a 'plait' in the sense of either a twisted skein of wool or a loaf of bread formed in the same configuration. So the phrase here would mean something like 'mixed red wool skeins'.

67 KAV 99:43–6.

68 See CAD U/W, 256.

69 Jakob 2003, 412–430.

70 Jakob 2003, 412–420 with edition of MARV 3.5.

71 Rölli 2002, 593–4, n. 19.

72 Jakob 2003, 421.

73 Jakob 2003, 421–425.

74 Jakob 2003, 425–428.

75 Jakob 2003, 428–429.

76 Jakob 2003, 430.

77 Whiting 1988.

78 Postgate 2001, 375, note 6, mentioning MAH 16086 *á-meš ša ab-ba-še* (for which see below under *aḫātu*), and the Coronation Ritual, both unhelpful. MAH 15854 referred to several types of garment which were each 'made(?)' (*ub/p-b/pu-ša*) of a certain number of minas (figures broken away), see Aššur 2/iv. p. 2. Cf. also the verb *uppusu* in Middle Babylonian texts (Aro 1970, 34).

79 *Munus-meš ša 60 ^uša-ba-ta-te ù 60 túg-gú-è-meš e-pa-ša-ni* Tsukimoto 1992 26–7 text B 9–10; *munus-meš ša ma-dš-ḥi-ri e-pa-ša-ni* text B Rev 8'-9'; 6 *ma-na śig lá-meš ša maš-ḥi-ri e-pa-ša i-ta-na* Rölli 2002, No. 5. Cf. also MARV 3.8:36' *ana e-pa-še lā ušašbitūni*, referring to carpets(?), and at Atmannu 'wool issued to 6 women for making (*a-na e-pa-še*) 3 Cypriot *lubēru*' (No. 23; cf. No. 22, for making *šiprāte*).

80 Landsberger and Gurney 1957–1958.

81 Although at Guzana in addition to *urṭū*, the logograms *śig-za-gin-sa₅* and *śig-za-gin-na* (possibly for *uqniātu*?) are encountered in one administrative document (AfO Beiheft 6, No. 62).

82 SAA 7.110; 7.111; 11.26.

83 SAA 7.166 and 167.

84 Michel and Nosch 2010.

85 Aro 1970, 22–34.

86 CAD A/i, 208.

87 MARV 1.24:6' 1-*ni-a-tu túg a-ḥa-tu*.

- 88 *a-na* 2-šu túg *a-ḥa-te* ša *šir-pi* KAV 105:14–15.
 89 AfO 19 Taf. 6:1–4, 2 túg *ḥu-la-an-na-tu* ša ^{giše}re-ni ša *a-ḥa-te* 1 túg *ḥu-la-nu* ša *te-še-ni eg-ru-te a-ḥa-tu-ša la-áš-šu*
 90 ša á-meš ù gab-meš ⅔ ma-na za-gìn-saš.
 91 ša gab-meš á-meš ša *mul-ta-x*[...].
 92 text No. 23:2 3 *lu-be-ri a-la-zí-a-e*.
 93 Röllig 2002 Nr. 12:11 túg *a-la-zí-a*.
 94 Cf. CAD I/I, 90 s.v. i'lu A '(a garment)'.
 95 MARV 10.59:11; 82:1
 96 KAJ 256:5; MARV 3.13:1'; 3.5:26'; 7.102:20'; 9.89:7'.
 97 MARV 3.8:27'.
 98 cited CAD I/J s.v.
 99 Freydank and Saporetti 1989: AfO 19 T. 6:6 2 túg-ḥi-a *a-ši-a-nu*; Iraq 35 T.13 1:4 1 túg *a-ši-a-an-nu*.
 100 Stewards' Archive.
 101 CAD B, 261.
 102 CAD H, 229; AHw 354 'Decke'.
 103 cf. CAD B, 258a.
 104 See above under *aḫātu* for the Akkadian. For other occurrences see KAJ 273 = MARV 3.71:1 1 túg *ḥu-la-a-nu*; MARV 10.54:1, 2 túg *ḥu-la-na-t[u]*; MARV 10.64:11', 1 túg *ḥu-la-nu* [.
 105 CAD I/J, 241; AHw 394.
 106 Aro 1970, 25.
 107 ša úr babbar. AfO 19. Taf. 7.1:1, 5: 1 túg *išḥanabe* ša úr babbar (*iškāru* issued to the merchant Siqi-ilani for kaskal kur *ki-na-ḥi*). Donbaz 1991, 77 A.70: 1 túg *išḥanabe* ša úr babbar, cf. 4. (*iškāru* issued to Siqi-ilani). 1 túg *išḥanabe* ša úr babbar ša *lime* 'lu-la-IA-e Donbaz 1991, A. 70:1–3, cf. 4.
 108 Röllig 2002 Nr. 12:10. Cf. Landsberger 1967. Other MA instances: Aššur 2/iv, p. 5; túg *iš-ḥa-na-be* ša *giš-gār* (= *iškāri*) MARV 8.10:9', 15', 20'; 1 túg *iš-ḥa*[MARV 3.12:2; KAJ 231:5.
 109 CAD K, 384.
 110 Iraq 35 T.13 No. 1:1]x *ki-da-pa-še*; AfO 19 Taf. 6:5 1 túg-ḥi-a [*ki*]-in-da-ba-š[e].
 111 Aššur 2/iv, p. 5.
 112 CAD K, 485–7.
 113 MARV 3, p. 12, on No. 53.
 114 MARV 3.5:33', 6 túg-sagšu-meš babbar-meš 2 ma-na 'PN, so weighing 20 shekels each.
 115 MARV 3.53:1–2, 310 túg-ugu-meš ša *ta-ḥap-še*.
 116 MARV 3.12:4, see Freydank AoF 21 (1994) 31, 1 túg-ugu [...].
 117 CAD K, 492; AHw 499.
 118 KAJ 310 (= Postgate 1988 No. 50) 33–35.
 119 KAV 103.7–9: "I have sent you PN carrying a chestful of *kuddilu*" (PN *al-tap-ra tup-ni-na* ša *ku-ud-di-li na-a-ši*).
 120 ta? ša qu-u[p-pi] ša *ku-[ud-d]i-li i + na* gada-meš *pa-ni[-a-te]* 1 gada *lu* túg-gú-è *lu* túg-bar-dul gal *še-li-a-ni*.
 121 CAD K 585–7, but with no Middle Assyrian passages; AHw 514 'Gewand'.
 122 1 túg-bar-dul *giš-gār* ša PN ša *li-me* PN *a-na Siqi-ilani a-na* kaskal-ni kur *ki-na-ḥi ta-ad-na-at* (Postgate and Collon 1999–2001 BM 108965:2); cf. AfO 19 Taf. 7.1:3 1 túg-bar-dul *giš-gār* ša PN.
 123 Röllig 2002 Nr. 12.7: 8 ma-na 2 túg-bar-dul.
 124 Aššur 2/iv, p. 6: MAH 16086 A.ii.11, 13, as uniform for 'king's troops'. Also from Aššur: 1 túg-bar-dul MARV 3.5:8', 6 túg-bar-dul túg [*b*]ir-mu ša *si-ku-te*, *ibid.* 38'–39'; 1 túg-bar-dul *za-*[MARV 10.3:14.
 125 Röllig 2002, Nr. 12.7.
 126 CAD L, 200; AHw 554 (not citing MA examples).
 127 Donbaz 1991, 75–6: A 1722:5 5 túg *li-pu* ša *bir-me iš-tu lu-bu-ul-te* ša ^{siš}tup-ni-ni ša ^{uru}ki-li-zi *še-lu-a-ta-an-ni*; Donbaz 1997, 107: A. 1598:38: túg *li-pu*.
 128 Aššur 2/iv, p. 6.
 129 MARV 3.5:36'–37': 2½ túg *li-pu* ...
 130 5 túg *li-pu* ša *bir-me* ša [MARV (1).24: 5'; A 1722 (see footnote 127).
 131 CAD L, 232.
 132 *a-na* 3 *lu-be-ri a-la-zí-a-e* Ismail and Postgate 2008, No. 23:2.
 133 *ana* [síg]-za-gìn-g[íe] *ana* *ša-pu-e tadnaššu*, Ass. 2001.D-2219, Frahm 2002, 80; see also []-im/iḥ *lu-be-ri* MARV 8.83:3'.
 134 2 túg *ni-ik-su* 1 *lu-be-ru* *áš-šu-ra-lu-ú* Faist 2001:6.
 135 Villard 2010, 395; SAA 7, xxix.
 136 1 túg *ma-ak-lu-lu* ša kin *ši-pár* x[... MARV 1.24:7'.

- 137 2 túg-ḥi-a ša kin ša ṣ[e]-e-ri a-di ma-ak-li-l[i]-šu-nu KAV 99:15–16.
 138 For *maklalu* in the West and an Egyptian equivalent cf. Edel 1992.
 139 CAD M/i, 277–8.
 140 2 túg-ḥi-a-[me]š ù 2 túg *mar-da-a-tu* [MARV 3.8:35].
 141 Köcher 1957–58.
 142 Though CAD M/i. 366 cites a form *mašḥurannu* from Ugarit.
 143 Ismail and Postgate 2008, Nos 12; 15; 23.
 144 Röllig 2002 Nr. 1–12.
 145 MARV 2.27 (see below); 25 túg *ma-áš-ḥu* [(*-ru*) MARV 9.28:7].
 146 MARV 2.27.iv.3'-5', šu-nigin 7 munus-meš ša túg *maš-ḥi-ri* [] 24 túg *maš-ḥi-ri e-pa-ša* [] 24 lú-meš ša kin *ú-la-ba-ša* [.]
 147 Tsukimoto 1992 Text B, Rs. 8'-9': munus-meš ša *ma-áš-ḥi-ri e-pa-ša-ni*.
 148 1 gú-un 30 ma-na síg-meš *a-na* 15 ^{úg}*maš-ḥi-ri ta-ad-na*.
 149 Röllig 2002, No. 12:8–9, 13–14, 16.
 150 See SAA 7 p. 218 s.v. *nahḥaptu*. CAD N/i, 138–40.
 151 In the Urad-Šerua archive, KAJ 77 (Postgate 1988, No. 53):9–10 1 ^{úg}*na-ḥa-áp-ta* [š]*a-na-i-ta* 'second class'.
 152 See MARV 1.24:13' 1 túg-gú-è ša [sí-ga]-gin sa₅ ša gab-meš á-meš-ša *mul-ta-x*[-]; and ša á-meš ù gab-meš 2/3 ma-na za-gin-sa₅ MARV 3.5: 17'. For the 'breasts' (GAB.MEŠ) in Neo-Assyrian note túg-gú-è ša gab-meš, Practical Vocabulary of Aššur I. 224 (Landsberger and Gurney 1957–58).
 153 MARV 10.8:1; 35:1.
 154 síg-za-gin-sa₅ MARV 1.24:13'; MARV 3.5:16', 18'; síg-za-gin gi₆ MARV 10.64:14'; [x] túg-gú-è síg-za-gin-meš MARV 10. 77:1 (see above under *uqnātu*).
 155 MARV 3.5:20'; 10.8:2; 10.36:1; 10.59:10.
 156 MARV 10.77.
 157 Aššur 2/iv, p.6 (B.ii.17').
 158 MARV 3.5:26', [1] túg-gú-è šá *a'-li*.
 159 Túg-gú-è-meš ša ^{munus}*ták-lak-a-na-á* *šur u* ^{munus}*ni-nu-a-šar-rat 2-ia-a-tu*.
 160 Tsukimoto 1992, Text B:8–10. However, despite the plural form used for each type of garment it seems more likely that these women described as munus-meš ša 1 ^{úg}*ša-ba-ta-te* ù 1 túg-gú-è-meš *e-pa-ša-ni* are each expected to make one (rather than 60 with Tsukimoto) coat and one *ša battāte* with their 13 minas.
 161 me 5 šu-si gú-è MARV 10.5:1; if correctly read, this seems to record "[x] hundred and 5 finger(s) of coat(s)", but it must be deemed uncertain.
 162 6 túg-gú-è-meš 4 ^{túg}*ni-ik-si* Radner 2004, 82, No. 4:30–31.
 163 CAD N/i, 181 (with no MA but three Nuzi examples).
 164 so also Deller 1987a, 193; no need with CAD to think of *kabāsu* 'to full cloth'.
 165 MARV 3.5:34', túg *na-ak-bu-su* ša giš-gigir.
 166 Durand 2009, 73.
 167 Donbaz 1997, 104 A. 1587.
 168 Deller 1987a, 187. now add Faist 2001:6 2 túg *ni-ik-su 1 lu-be-ru áš-šu-ra-iu-ú*.
 169 1 TÚG *nik-su* ša *ma*-[MARV (1), 24:3', cf. 1'-2', 14']
 170 1 túg *nik-su a-na* PN *ilteqe* MARV 10.10:1.
 171 Radner 2004 No.4:31.
 172 CAD P 203–205 s.v. *paršigu* A (no MA ref. listed).
 173 JCS 7 No. 61:16.
 174 Freydanck and Saporetto 1989 *Iraq* 35 T.13:7.
 175 MARV 3.5:25'.
 176 Aro 1970, p. 31.
 177 CAD has the OA word under *širu* B and the OB references under *ziru* B. Some of the Mari passages cited in Durand 2009, 140 s.v. *zīrum* tend to suggest a large utilitarian cloth rather than a tent.
 178 [1' šī]-di ^{túg}*si-i-ri* MARV 10.27:1 cf. 3, 6; 64 (items) *a-di* 1 ^{túg}*si-i-ri* MARV 10.60:6.
 179 Cited courtesy Dr Daisuke Shibata in Ismail and Postgate 2008; Tell Ali text No. 12: 1 gú-un 10 ma-na síg-meš *a-na* ^{túg}*su-ḥa-ie-e* ù ^{túg}*maš-ḥi-ri*.
 180 CAD S 388–90 s.v. *sūnu* B.
 181 Aro 1970, 31.
 182 Donbaz 1991, A. 70:1–2. Durand reaches very similar conclusions for Mari (2009, 93–95).
 183 *A-di* *úr-šu*, Aššur 2/iv, p. 7.
 184 2 túg *šu-ba-tu* ša *úr* síg-za-gin gi₆-a (sic! see copy), Donbaz 1991, 74–75; from the same archive another *šubātu* with a *sūnu* is listed in AfO 19 T. 6:9–10 1 túg-ḥi-a *qa-at-nu* *ša-ú-pu* ša *úr* *gi-im-ri*. The

meaning of *ginri* is not clear to me.

185 AHW 1103 s.v. *šipirtu* III.

186 Ismail and Postgate 2008 No. 22: *túg]ši-ip-ra-te ša giš-ná-meš ša é-gallim*.

187 As suggested in SAA 7 p. 223, presumably reflecting AHW's 'Band od(er) Schärpe aus Textilgeflecht' which no doubt follows from von Soden's Aramaic etymology, now improbable given the 13th century examples.

188 Weidner, AfO 19 Taf. 6, edited Freydank and Saporetti 1989, 52.

189 1 *túg-ḫi-a ša kin* MARV (1), 24:6'; 1 *túg-ḫi-a šá kin* MARV 3.5:28'.

190 Unrevealing is MARV 3.5:1 (x +) 1 *túg-ḫi-a si-ru-[ri-bu (?)]*.

191 12 *ma-na sig-meš a-na* 1 *úgša bat-te-en ta-ad-na*.

192 1 *túg ša bat-te-en ša giš-gà[r* MARV 3.13:6', cf. 7'.

193 6 *túg ša bat-ta-[te* MARV 9.28:5'; compare perhaps Neo-Assyrian *túg-gú-è ša BE-ta-a-ti* in the Practical Vocabulary of Aššur, I. 223 (Landsberger and Gurney 1957–58). For a different approach to some of these passages see CAD B, 214–5 s.v. *betātu*.

194 *Munus-meš ša* 60 [or 1] *úgša ba-ta-te ù* 60 [or 1] *túg-gú-è-meš e-pa-ša-ni* (Tsukimoto 1992, Text B:8–10).

195 7 *kuš é ša-bat-ta-te gal-meš* KAV 104:5–6. It does not seem certain that the Mari term rendered *šābatum* in Durand 2009, 114 is the same word.

196 *Aššur* 2/iv p. 6.

197 1–*ni-a-tu úgša-ḫar-ra-tu ša gír lugal* Aššur 2/iv, p. 6; cf. also MARV 10.64:3' (1–*ni-ú-tu*).

198 Weidner 1954–6, 274:43.

199 MARV 3.5:32', 3–*šu úgša-ḫar-meš babbar-meš*.

200 *Aššur* 2/iv, p. 6.

201 Rouault 1977, ll. 40, 47; cf. Dalley 1980, 72.

202 *Aššur* 2/iv, p. 7.

203 *Aššur* 2/iv, p. 6.

204 *túg-ḫi-a qatnu ša-u-pu*, see under *subātu* above.

205 *Aššur* 2/iv, p. 7.

206 *Aššur* 2/iv, p. 7.

207 MARV 1, 24:6; MARV 3.5:28'; KAV 99:15.

208 MARV 1.24:7'.

209 *Aššur* 2/iv, p. 7.

210 Practical Vocabulary of Aššur 299f. *túg.bar.sig = zi-ziq-tú*, cf. CAD S, 322.

211 Already hinted at by HSS15 175:12 (cited CAD S 325) and spellings with GA in Old Assyrian and one Old Babylonian texts (cited CAD S 324–5).

21. “If you have sheep, you have all you need”.¹ Sheep Husbandry and Wool in the Economy of the Neo-Babylonian Ebabbar Temple at Sippar

Stefan Zawadzki

Although there is a rich sample of sources for the Neo-Babylonian period, they belong mostly to two categories. The first and largest category of documents concerning economic and administrative life comes from the temple archives. The second category consists of private archives and concerns loans, purchase of fields and orchards, inheritance, trade, family life, and so on. The majority of these documents belong to families closely related to the temples. Despite their richness, scholars paid little attention to them for a long time. The earliest useful studies on the economy of this period were published at the end of the 1940s and early 1950s.² Apart from the work by D. Cocquerillat,³ until the 80s, scholarly interest mostly concerned legal issues.⁴ Then, a rapid growth in interest began, when studies by G. van Driel,⁵ F. Joannès,⁶ M. A. Dandamayev,⁷ M. W. Stolpers (mostly dedicated to the Persian period) were published. This was partly due to the publication by I. G. Finkel of three volumes of copies made by T. G. Pinches,⁹ and three volumes of catalogues of the Babylonian tablets, mostly from the temple archives of Neo-Babylonian Sippar by E. Leichty.¹⁰ This resulted in the first publications of important studies by J. MacGinnis,¹¹ and A. C. V. M. Bongenaar¹² and in the following years by C. Wunsch,¹³ M. Jursa,¹⁴ P. Vargyas,¹⁵ K. Abraham,¹⁶ M. Kozuh,¹⁷ H. Baker,¹⁸ C. Waerzeggers,¹⁹ and many others. The most comprehensive of the various aspects of economic life has been published recently by M. Jursa. All those who read it are struck – I am sure – by its scope and its author’s knowledge of Babylonian sources, economy and modern economic methodology. The book gives a new, broad picture of the economy of the Ancient Near East, especially in Babylonia in the Neo- and Late-Babylonian period.²⁰ Although the book will be a ‘Bible’ for any future studies, it is natural that some of its general theses will be subject to further considerations.

One thesis which should be thoroughly examined is the idea that sheep husbandry in the Neo- and Late-Babylonian Ebabbar temple at Sippar was unable to meet the current needs in respect to regular and occasional offerings, i.e. that the temple suffered from a shortage of sheep even for offerings. If it were so, it would mean that there was a fundamental difference in the economy of the Ebabbar temple in the north, and the Eanna temple in the south of the country, and more

generally, in the model of economy of both regions. This is because in the south the sheep husbandry was a substantial sector of the economy, and wool was a substantial source of income.

Jursa's conclusion is based primarily on a group of eight administrative documents dated to a short period between the 12th and the 14th year of Nabonidus. These concern 11 transactions involving in all about 310 sheep for an amount of 12 minas 15 1/3 shekels.²¹ The transactions differed from year to year. For the 12th year, five transactions concern 165 sheep; for the 13th year four transactions deal with about 125 sheep and the 14th year, one transaction of only six sheep. These data are compared by Jursa with BM 63447:²² a settlement of account with two *rē'i sattukki*²³ from month Tašritu (vii) in the 11th year of Nabonidus, until month Arahsamna (viii) in the following year. According to this document, 3281 sheep were at the disposal of the *rē'i sattukkē*, of which 445 had been bought by the temple and 980 sheep were qualified as "the offerings of the kings (*niqê šarri*)". There are many cases of purchase of sheep for offerings in the Sippar temple archive: at least seven are dated to the reign of Nebuchadnezzar, 18 to the reign of Nabonidus, seven to the reign of Cyrus, five to the reign of Cambyses and 18 to the reign of Darius; all together 55 transactions. The aim of these purchases was to prevent a lack of sheep for offerings.

However, can these be considered as evidence of a long period of sheep shortage? A close look at the data is needed. Let us start from the *AfO* mentioned settlement of account. It seems certain that before the decision to purchase sheep was taken, the temple knew in advance the number of sheep that were promised (and presumably already delivered) by the king as his share in the Eabbar sheep offerings. This conclusion is supported by the following arguments:

a. BM 60635²⁴ makes it possible to state that the Eabbar temple received the same number of sheep for *niqê šarri* from Rašappa²⁵ during the reigns of Cyrus, Cambyses and Darius, i.e. the temple could accurately calculate the number of sheep to be taken for offerings from these flocks,

b. It should be noted that sheep qualified as *niqê šarri* were usually delivered to the *rē'i sattukkē* and only seldom, and in small numbers, directly to the 'fattening house', where they were prepared, or more precisely fattened before being served to the gods. Again, the temple knew, in advance, how many sheep would be granted by the king.²⁶ Such a high participation of the king in offerings of sheep (here about 30%) cannot be a good argument for the suggestion that the Eabbar temple suffered from the shortage of sheep for offerings. Indeed, the king's participation in Uruk, although lower, was still over 20%, however, nobody suggested that this was an indication of a shortage of sheep in the Eanna temple, if only because of the sales of large quantities wool.²⁷ It seems that the high participation of the king in animal offerings should be explained rather by the ideology: Babylonian kings were providers (*zānin*) of the temple. Royal inscriptions stress his responsibility mainly towards Bēl/Marduk of Esagila in Babylon and Nabû of Ezida at Borsippa, i.e. as P.-A. Beaulieu wrote, the kings were providers of the 'imperial gods', participation of the kings in offerings for other temples was out of the question. Royal inscriptions evoke the enlargement of the king's offerings, and it is unlikely that such a statement had a purely propagandistic character.²⁸ A comparison of the total amount of sheep owned by the temple (including the *niqê šarri*) according to the settlement of account, and those sacrificed shows that,

without making any purchase, the temple would be left with 62 sheep above the number needed for offerings. In practice, this is reduced to only 12 sheep as we read that 50 sheep died before they were sacrificed. It still remains unclear why the temple (or more precisely the *rē'i sattukkē*) decided to buy so many sheep (445) during the year.²⁹

To understand this decision, it is important to note the numbers of sheep bought in each transaction. Among the 55 transactions, the temple bought a larger number of sheep in only a few cases:

Purchases of sheep (high numbers)

Nbk 353 (Babylon) m 56½ š
 BM 63842 (Bertin 1159 (9. Nbk 41)
 HSM 708 (Sheep 46 (6. Nbk 32)
 HSM 489 (Sheep 46 (6. Nbk 12)
 Nbn 738 (Sheep 38)
 BM 60876 (x.Nb)n [x]
 BM 54219 (x.kshb)n [x]
 CT 548348 (s.1.Nbn [x])
 BM 57108 (s.1.Dar 28) kurru of dates

The purchases are sometimes quite frequent and sizeable, for example in the 3rd year of Cyrus, when in four transactions the temple bought 104 (the smallest purchase was 20 sheep, the largest, 32 sheep), plus 8 sheep in a fifth transaction.³⁰ It might be assumed that in some years, Nbk 30, Nbn 12–13, and presumably in Cyr 3, the shortage of sheep for offerings was considerable and that the number of sheep in the flocks might have actually decreased.

In the majority of transactions the number of sheep bought was very small, limited to a dozen or so, as demonstrated by the purchases in the time of Darius:

Sheep for offerings purchased during the reign of Darius

1 sheep
 2 sheep
 5 sheep
 10 sheep
 11 sheep
 13 sheep
 16 sheep
 18 sheep
 20 sheep
 70 sheep
 x sheep documents

188 sheep in 17 transactions

Reasons for purchasing large or small numbers of sheep were presumably different. Let us analyze first the documents which relate to the purchase of considerable numbers of sheep. These might have been a consequence of losses of sheep previously selected for offerings, caused by their death.

Losses of the offering sheep due to death

BM 63516 (Sheep of Nabonidus):
 CT 53142 (2d sheep
 BM 61832 (Sheep 5):
 BM 63447 (2d sheep 12):
 Nbn 804 (Nbn 3) sheep

BM 60483 (all sheep destroyed):

Additionally, an important number of *ḥalqūtu* ('missing') sheep were lost during the journey-from the distant pasture to the temple.³¹ Sheep also died in the 'fattening house' and in the households of the farmers, usually tenants of the temple, who were obliged to care for the sheep (usually one sheep was entrusted to each 'house') which were allocated for offerings and supplied, at least partly by the temple, with fodder.³² Losses, as already noted by van Driel, were sometimes high: in CT 55, 492 (year, unfortunately destroyed) as many as 31 sheep died out of the 91 sheep entrusted to 'houses', i.e. a little more than a third of the total number. These documents suggest that purchases did not necessarily result from a permanent shortage of sheep, but by misfortune: unexpectedly high losses caused by diseases, injuries, attacks by wild animals or even theft³³ and so on, which had to be covered immediately.

There are also some reasons for thinking that small purchases might have been caused by the death of previously selected sheep. Such an idea results from an observation of lists of sheep selected for *sattukku* and *guqqû* to be sacrificed in a given month, known from Uruk as the 'tabular sacrifice records'.³⁴ These lists give precisely the number of selected sheep for the given day, usually separately for *sattukku* and *guqqû*, and how many died before the coming month's ceremony for which they were destined.³⁵

Total number of sheep for *sattukku* and *guqqû* and losses

Text		<i>sattukku</i>	dead <i>sattukku</i>	<i>guqqû</i>	dead <i>guqqû</i>
YBC 3958	I Camb 1	202	0	143	3 ³⁶
YOS 1, 51	I Camb 6	216	0	134	2
BM 114538 ³⁷	I Camb [x]	127 ³⁸	0	116	
UCP IX, p. 106, No. 49	I [KN x]	87 ³⁹	0	72 ⁴⁰	80
YBC 3968	II Camb 1	153 ⁴¹	0	120	6
YBC 3977	II Camb 2	109 ⁴²	0	112 ⁴³	6
BM 114553 ⁴⁴	II Camb 4	total 277 ⁴⁵ <i>sattukku</i> and <i>guqqû</i> sheep, 4 died			
YBC 3965	II Camb 5	155	0	129	0
TCL 13, 175	II Camb 6	137 ⁴⁶	0	125	6
TCL 13, 145	III Cyr 9	161	0	131	9
TCL 13, 176	III Camb 0	153	0	109 ⁴⁷	3 ⁴⁸
YBC 3964	IV Camb 1	219 ⁴⁹	4	139	13
SAKF 7, 162	IV Camb 2	112 ⁵⁰	0	94 ⁵¹	5
NCBT 1028	IV Camb 3	total 303 <i>sattukku</i> and <i>guqqû</i> sheep, none died			
TCL 13, 148	V Camb 1	159 ⁵²	9	123	14
YBC 3959	V Camb 2	139 ⁵³	1	121 ⁵⁴	10
YBC 3962	V Camb 3	244 ⁵⁵	4	30	0 ⁵⁶
Or 5, p. 45	V Camb 4	198	2	90	1
YBC 3975	V Camb 5	159	0	124	3
YOS 1, 50	V ⁵⁷ Camb 5	159	0	124	2
YBC 3978	V Camb 6	142 ⁵⁸	0	134	5
YOS 7, 64	VI Cyr 7	163 ⁵⁹	2	93 ⁶⁰	7
AnOr 8, 69	VI Camb 3	258 ⁶¹	1	32	0 ⁶²
BIN I 167	[VII] ⁶³ Cyr [x]	225	2	134	8
YOS 1, 47	[VII] ⁶⁴ Camb 0	210 ⁶⁵	3	156	13

YBC 3966	VII Camb 3	total 352 <i>sattukku</i> and <i>guqqû</i> sheep, 1 died			
YBC 3969	VII Camb 5	208	1	143	3
YBC 3980	VII Camb 5	168 ⁶⁶	[1]	111 ⁶⁷	0
BM 114534 ⁶⁸	VIII Camb 0	127 ⁶⁹	0	116	8
YBC 3976	VIII Camb 1	210	20	77 ⁷⁰	12
YBC 3960	VIII Camb 2	124	0	134	4
YBC 3973	VIII Camb 5	150	1	13	2
BM 114535 ⁷¹	IX Nbn 7	225 ⁷²	6		
YOS 6, 226	IX Nbn 13	245 ⁷³	0	189 ⁷⁴	0
YOS 1, 46	IX Cyr 5	278	0	130	4
AnOr 8, 78	IX Camb 5	283	0	170	4 ⁷⁵
YBC 3507	X [KN x]	149 ⁷⁶	4	89 ⁷⁷	15
YBC 3979	X Camb 0	177	3	177	1
YOS 1, 48	X Camb 1	175	3	122	10
YOS 1, 49	X Camb 3	total 259+x <i>sattukku</i> and <i>guqqû</i> sheep, 3 died			
TCL 13, 169	X Camb 5	148 ⁷⁸	1	135	3
AnOr 8, 65	XI Camb 0	177	5	127	8
RC 709 ⁷⁹	XII Nbn 5	279 ⁸⁰	0	249 ⁸¹	7 ⁸²
AnOr 8, 72	XII Camb 3	total 728 <i>sattukku</i> and <i>guqqû</i> sheep, 5 died			
AnOr 8, 75	XII Camb 4	493 ⁸³	2 ⁸⁴	182 ⁸⁵	3 ⁸⁶
BM 114536	XIIb Camb [5]	155	3	124	2
BM 114541	[x] ⁸⁷ Camb 5	78	0	146	2

The data from Uruk allow for some interesting observations:

a. The mortality rate for sheep destined for *sattukku* offerings was evidently lower than that for *guqqû* offerings. In the 39 comparable documents (including both lists of sheep for *sattukku* and *guqqû*)⁸⁸ 71 *sattukku* sheep died compared to 218 *guqqû* sheep, i.e. the mortality rate in *guqqû* sheep was a little over three times higher, in fact much higher when we take into account the fact the number of sheep for *sattukku* offerings was much higher than for *guqqû* offerings. The difference is particularly clear when we consider the fact that there are no losses of sheep in 20 documents in the *sattukku* column, but only in four documents in the *guqqû* column.⁸⁹

b. The reason for the higher mortality of sheep for *guqqû* offerings might presumably be explained on the basis of the heading, where it is stated that sheep *ul-tu é ú-re-e ú la-pa-ni* ^{lú}sipa *sá.dug₄ ana sá.dug₄ ú gu-uq-qu-ú par-su*, “were selected from the fattening house and from before the shepherds of the regular offerings”. It seems that, at least in these texts, sheep issued for *sattukku* offerings were brought from the fattening house, where they were fattened, while sheep for *guqqû* offerings were usually brought directly from flocks that were kept quite far from temple; the risk of losses was obviously much higher than for those sheep which had already been moved to the fattening house and certainly fed much better.

c. Five records: BM 114553, NCBT 1028, YBC 3966, YOS 1 49 and AnOr 8 72 are atypical because they list together sheep for both types of offerings. This is confirmed by the heading: sheep are assigned for *sattukku* and *quqqû*, and by the numbers of sheep comparable to the total number in the other texts, where the sheep for each type of offering are listed separately.⁹⁰ Counting together sheep for both offerings is an important change in the organization of cultic service. All these documents come from only two years: three from the third year, and one from the fourth year of Cambyases.⁹¹ There are no similar lists from any earlier or later years. It should be noted that small losses occurred in the common lists (4, 0, 1, 3 and 5 sheep),⁹² but also in two documents with separate lists of offerings (YBC

3962 and AnOr 8, 6) where no losses took place. The lack of losses in the last two documents might be explained by better guard of small herds of sheep brought from distant pasture because *guqqû* sheep in these documents decreased to one sheep daily.⁹³ The reason for this change becomes clear when we compare the losses of sheep in the years preceding the introduction of common lists. The small losses, between two and five sheep, increased significantly at the beginning of Cambyses' reign (Table 21.1).

Month	Cyr 7	Cyr 9	Cyr x	Camb 0	Camb 1	Camb 2	Camb 4	Camb 5	Camb 6
Nisannu					3				
Ayaru					6	6			
Simanu		9		3					
Du'uzu					13	5			
Abu					14	10	1	3	5
Ulûlu	7								
Tašrîtu			8	13				0 or 3	
Arahšamna				8	12	4		2	
Kišlîmu								4	
Tebētu				1	10		3	3	
Sabaṭu				8					
Addaru									
Addaru II								2	

Table 21.1. Losses of *guqqû* sheep in Uruk in the time of Cambyses. Blank spaces in the table indicate that no data, are available. Data from the common lists are not included in the table

The low number of lost sheep in the common lists indicates that the temple's authorities decided to take action to limit losses of sheep for *guqqû* offerings noted in the previous years. YBC 3962 and AnOr 8, 69 show that, to limit losses, the decision to decrease the number of animals delivered from distant pastures has been made, while common lists suggest that they finally decided to stop bringing sheep from these pastures, i.e. that all sheep on common lists come from the fattening house,⁹⁴ or maybe some of them from 'houses' located close to the temple. It seems highly probable that the decision resulted from the short-term climatic change in southern Babylonia: draught years resulting in a shortage of food (mainly barley) and even famine in southern Babylonia in the period of 528–526 BC, i.e. the second and third year of Cambyses, recognized and documented in the highly interesting article by K. Kleber.⁹⁵ It seems that the high losses in offering sheep noted during three consecutive years (Camb 0 – 2) were not caused by natural losses (diseases, attacks of wild animals, etc.), but by hungry people who attacked and robbed animals to avoid starvation. TCL 13, 148 dated to the first year, fifth month, when losses were extremely high in both types of sheep offerings suggests that the shortage of food was so painful that even sheep from the fattening house were stolen and eaten by hungry people. The data presented in the table above suggest that the crisis was presumably a little longer; we might recognize its first symptoms in the accession year of Cambyses, and – although the data are scarce – maybe already at the very end of Cyrus' reign.⁹⁶ When the crisis ended, presumably – as showed by Kleber – as a result of a better cereal crops in the fourth year, the temple returned to the custom of bringing sheep for *guqqû* offerings from distant pastures and the common lists were no longer used.

In general, because almost all sheep for offerings came from the flocks of the *rē'i sattukkē* the difference between sheep for *sattukku* and for *quqqû* was determined by the fact that the sheep for *quqqû* offerings brought from the pastures were

sacrificed without fattening in the fattening house and for this reason might have been of lower quality.

d. The most surprising observation results from the fact that the dead sheep are related to a specific day. Since the documents clearly indicate how many sheep for a given day died, this suggests that the temple accountant was able to identify the sheep destined for that day (dead animals could not be offered to the gods). This suggests that each sheep was marked in a specific way according to the day on which it was destined for offering or sheep were kept separately in small pens.

e. Were the lists composed before the month given in the heading or after the end of the month, i.e. when sheep had already been sacrificed? According to E. Robbins “after the end of the month the scribe apparently prepared a summary of disbursements for the month preceding”.⁹⁷ However, in my opinion, one important argument, speaks for the opposite interpretation. First, the collation of the Louvre tabular texts⁹⁸ demonstrates that the list counted offerings for every day of the month. In this respect, the last line of TCL 13, 169 is important, where the badly preserved numerals are followed by *ina amāri* ‘(given) for inspection’. This means that the sheep were checked in a different place in order to determine their suitability for offerings. This implies that such lists were composed before the month during which the sheep would be slaughtered.⁹⁹

The losses in both groups might be compared with purchases of sheep known from documents of the Sippar archive. It is likely that small purchases (maybe up to about 20 sheep) corresponded to unexpected losses.

BM 64467 indicates that sheep were purchased in emergency situations.¹⁰⁰ In the middle of the month Arahsamna (viii), 12th year of Nabonidus, the temple bought six sheep for 30 shekels of silver, and separately three sheep for eight shekels. The purchased sheep were divided into two groups: the first one, five shekels each, was sent to the *bīt urê*, ‘the fattening house’ and given to the well-known overseer Nūr-Šamaš, who managed the sheep sector, while the second group, 2.67 shekels each, was sacrificed for *sattukku* offerings at once. It may seem that the more expensive sheep were better quality and that these should be sacrificed first, however the decision was quite opposite. What could therefore have affected the price of these sheep? The price of sheep which had to be sacrificed at once: 2.67 shekels each, is about 30% more than the average (a little less than 2 shekels). This price was beneficial for the seller as well as for the temple. This is clearly seen when we compare it with the price of much more expensive remaining six sheep. It seems that specific circumstances influenced on price of each group of sheep and the decision of both parties. We have to take into account the fact the sheep for offerings had to meet several criteria, maybe not all of them have already been recognized. They first had to be pure from a cultic perspective, for example, lacking any physical defects. Secondly, a criterion of age is perceptible in the sources: the majority of sheep sacrificed were young lambs,¹⁰¹ in their first year of life, that is before the beginning of puberty. In the forced situation caused by an unexpected lack of sheep for offerings, the temple was ready to pay a slightly higher price, but also the seller could not have expectations that were too elevated, because after reaching the age limit, which excluded the sheep from the possibility of sacrifice in the temple, their price would be lower, below 2 shekels each. Thus, it seems highly likely that these three sheep were close to the age limit acceptable for offerings and the temple selected the animals in the

best possible condition allowing their immediate slaughter for offerings. In the case of the six more expensive sheep (where the price is 2.5 times the average price) this might be seen as appropriate for younger lambs. Here, the temple's negotiating position was worse: the purchase was necessary but the seller did not need to sell the lambs immediately as the one year limit was not so close. The research of R. Tarasewicz shows that the process of fattening in the fattening house lasted from one to three months (full cycle). In other words, when the temple didn't have enough sheep and wanted to observe the standard it was forced to buy sheep at an age such that it was possible for them to go through the fattening process in the fattening house. In such a situation, younger sheep might have cost more than older ones.

The second reason for such purchases could also have been due to a small deficit in sacrificial sheep caused not by the death of sheep but disqualification, presumably because of cultic impurity. Tarasewicz's research demonstrates that the sheep which went through the fattening process were described as *rabû* sheep. Data in Jursa's book and Tarasewicz's manuscript concern the sale of such category of sheep and, what is important, the price of these sheep was much higher, ranking from 5 to over 7 shekels per sheep, i.e. it is more than twice, sometimes almost three times higher than non-fattened sheep. These sheep were sold at the end or after the fattening process – in my opinion – because they were regarded as insufficiently pure to be sacrificed. This did not exclude their use in the non-cultic economy; the high price of the *rabû* sheep on the market is due to their fattening. When such *rabû* sheep could not be offered to the temple, it was necessary to purchase sheep for smooth functioning of the offerings' service. However, we have to be careful in recognizing these purchases as extra spending, significantly affecting the temple's budget. On the one hand, part of dead animals underwent conservation in salt and was destined for rations, i.e. replacing the other products. According to BM 63477 +, out of 50 dead sheep, 24 were stored in the *bit makkuri* storehouse, that is only 26 dead sheep could be lost, but presumably much less, as the text mentions the issue of carcasses to the builder (the singular does not exclude the possibility that he was the chief of a larger team) and to *ummānu*, i.e. 'qualified workers'. Some dead animals were sold on the open market, in fact for a much lower price, usually about half a shekel, however, the loss was partly reduced. And finally, the expenses for purchase of sheep were reduced by the high price of *rabû* sheep. In view of these observations two conclusions of M. Jursa need to be treated with great caution. Firstly, purchase of sheep¹⁰² does not imply that sheep husbandry in the Ebabbar temple was insufficient to fulfill the temple demand of offerings. Secondly, these purchases did not affect significantly the temple budget; if the balance was uneven, the measures, which had to be found to purchase sheep, were much smaller than were estimated by Jursa. It is worth noting that the price of sheep bought for offering was only slightly higher than an average price, but also lower prices have occurred. Accordingly, in Nbn 736, dated to the 13th year of Nabonidus the price of one sheep was only 1.43 shekel, and in the document from 28th year of Darius one sheep valued one *kurru* of dates, i.e. about 1 shekel. Of course, periodic fluctuations of price caused by collapse of sheep breeding cannot be ruled out; however, it is doubtful that the increase of purchases between Nbn 12th and 14th year can be explained by the decrease of sheep population. One thing is certain, if

the population of sheep decreased in these years, it did not affect the price of wool; the prices of wool in Sippar in the period from Nbn 7 to Nbn 16 are the lowest in comparison with the earlier and later period.¹⁰³ If we assume a decrease of sheep population, we would expect in parallel an increase of wool price, but this did not take place. Even if there were some problems with obtaining one of the categories of sheep, this did not influence the price of wool. Thus, the problem was not a lack of sheep, but rather different reason should be sought.

From the above discussion it seems clear that the repeated need to purchase sheep for offerings proves that the number of sheep left in the 'fattening house' and in the 'houses' was estimated to be too low, taking into account natural losses or recognition of some sheep as impure for cultic purposes. The responsibility for ensuring sheep for offerings, certainly for *sattukku* and, in the light of data from Uruk, also for *guqqû* rested on the 'herdsmen of the regular offerings'.¹⁰⁴ The repeated shortage might be interpreted as evidence that their flocks were too small to fulfill fully the obligations imposed on them. However, the question arises why, if the flocks were too small the temple authorities did not make the decision to enlarge them? The case of BM 63477+ where the *rē'i sattukkē*, responsible for providing sheep for offerings, have at their disposal enough sheep to cover the demand for sacrificial animals, but despite this, they purchased 445 sheep, raises the question of whether the reason was not a shortage of sheep, but rather a question of organization. It should be stressed that the 'fattening house' was evidently too small not only to fatten all the sacrificial sheep, but also to take care of them up to the appointed day. This is why some sacrificial sheep were placed in the farmer's pen, though, as shown in the example cited above, it carried the risk of high losses. The problem was not to enlarge herds or number of sheep in the herds supervised by the 'herdsmen of the sacrificial offerings', but to find place to hold a large number of sheep in close vicinity to the temple, which was located in an agricultural and horticultural zone. In the light of the quoted settlement of account each month about 230 sheep for *sattukku* offerings were sacrificed, while other types of offerings, mainly *guqqû* are also mentioned in the sources. The constant presence of a large number of sheep (taking into account their fattening in the zone close to the temple for three consecutive months) threatened to damage crop fields, gardens, orchards and the irrigation system. Presumably, for this reason, due to the lack of such a place, only a minimal number of sheep necessary for offerings were left in the close vicinity of the temple. It was economically more profitable to buy sheep on the local market than to enlarge the flock over the number required, especially as losses caused by death or impurity could not be planned. The pattern of purchases suggests that their aim was to prevent shortages in the short term. The large flocks remained almost all year round on a remote pasture far from the agricultural and horticultural area, which excluded a fast response and delivery of missing sheep.¹⁰⁵ The particularly numerous purchases in the month of Addaru (xii) and intercalary Addaru (about 1/4 of all dated purchases) cannot be accidental, because almost all the large purchases are also dated to this month. Many different reasons might be taken into account: the on-going winter season and difficulty of contacting the shepherds,¹⁰⁶ the lambing period, greater demand for offerings in that month (a situation observed in Uruk), and so on.

Number of purchases in particular months

Nisabur: 4

Aiaru

Sima^u

Du'u^u

Abu 0

Ulul⁶ or 6

Tasru^{ur} 4

Arah^{am}

Kislu^u

Teb^u

Saba^u

Addaru and

Addaru II

Discussing the question of shortages of sheep for offerings in the Ebabbar temple, the question of the profitability of sheep husbandry is important. In Polish we have the rhyming proverb: "*Kto ma owce, ten ma, co chce*", "If you have sheep, you have all you need", expressing a belief in the great profitability of sheep husbandry. It seems that this proverb might be suitable for Ancient Mesopotamia, at least in 1st millennium Babylonia. Assuming that the annual fertility was 80 lambs from 100 ewes, the flocks would double after two lambing seasons, if sales and consumption were reduced to the minimum.¹⁰⁷ This high profitability is demonstrated by the fact that the sale of wool from only three sheep brought an income equal to the monthly payment of an ordinary worker, and the capital was not only intact but doubled in a short period of time. An excellent example illustrating the scale of profitability of sheep farming is provided by the document BE 8, 63.¹⁰⁸ 14 ewes, 7 lambs and 3 goats were contracted to the shepherd or agent *ana zitti*, i.e. for a share in the profit. The owner's profit was fixed at 32 shekels for four years, i.e. a yearly average of 8 shekels, but the capital (sheep and goats) increased year by year without any engagement of the owners. It is no wonder that not only private persons but also institutions, palace and temples, were engaged in sheep husbandry. The profits, even if the flocks were entrusted to institutional shepherds or external agents, were so high that it seems unlikely that the Ebabbar temple resigned from such a profitable interest, burdening its budget for additional expenses. It should be stressed that the conditions for sheep breeding on the large pastures east and north of Sippar were excellent: the best evidence is the grazing of the sheep from the Eanna temple there, a few hundred kilometers away from the temple. The high profitability of sheep farming was soon recognized by the Persians. The example of Arsames, active in the time of Darius II, who made sheep breeding one of the important sources of his income, is well known.¹⁰⁹ The unpublished document¹¹⁰ demonstrates the Persian royal family's involvement in sheep husbandry in Mesopotamia already at the time of Darius I. It appears from this tablet, dated to the 35th year of Darius I, that the owner of the flock of sheep was the Persian princess, known from a text dated to the first year of Xerxes I.¹¹¹ Summing up: there is no reason to think either that the Ebabbar temple suffered from a shortage of sheep for offerings, nor that it deliberately abandoned the development of sheep husbandry, which gave a reliable and relatively high income from the sale of sheep, fees for the leasing of flocks and the sale of wool. In my opinion the model of the economy in the north and the south of the country did not differ significantly; sheep husbandry was in both regions a major part of income of local institutions.

Let us try now to evaluate the minimum number of sheep needed by the temple for cultic purposes and, on this basis, the lowest possible annual yield of wool. The following data deliver useful information:

- the number of sheep in the flocks of the *rē'i sattukkē* based on the number of lambs issued by them for offerings
- total number of sheep in the temple flocks estimated on the basis of the daily sheep offerings (on the basis of tabulated animal offerings)
- quantity of wool used for the given month (*dullu* iti.x)
- the quantity of wool used for different purposes
- quantity of wool issued to the prebendary weavers
- quantity of wool needed for the manufacture of garments for the main gods worshipped at Sippar.

The estimation of the total number of adult sheep in the flocks of *rē'i sattukkē* is based on the settlement of accounts discussed above (BM 63447+). The total of 3281 sheep should be reduced by 980 *niqē šarri* and 445 purchased sheep, i.e. they have to deliver 1856 lambs from their own flocks. However, since statistically an approximately equal number of male and female lambs were born, the total number of new born must be estimated to about 3700 lambs. Then to calculate the number of ewes it is necessary to add 740 to allow for the 20% of ewes which did not give birth. In total this implies over 4440 ewes, and if an allowance is made of, say, 160 rams, giving a grand total of about 4600 adult sheep. The yield from this number of sheep might be calculated to about 115 talents, 3450 kg of wool or 34.5 tons.

The data from the animal offerings list lead to the conclusion that about 16 sheep daily¹¹² were sacrificed for the gods worshipped at Sippar, in total 5500 annually. The method of calculation used above makes it possible to estimate the minimum number of ewes and rams to be about 14,000. Adding new born animals, the flocks exceeded 25,000 animals. Assuming the standard norm of 90 shekels per sheep and that only adult sheep were sheared, the yearly production of wool would be about 350 talents, or 10,500 kg or 10.5 tons. That is about 3.5 times less than production of wool in Uruk.¹¹³

Let us compare these calculations with the data for the wool issued for manufacture of woolen products in a given month. According to BM 60933 = GG II 395¹¹⁴ (Nbn 13), 10 talents of wool (the yield of 400 sheep) were issued *ana dullu*, 'for work' in the month Addaru (xii), however, only half a talent was used for the manufacture of some items of the goddess's clothing (name not mentioned) during the 13th and 14th year. According to BM 74479 = GG II 441, three talents 45 minas of wool were issued for regular offerings and prebendary income of the prebendary weavers (*sattukku* and *pappasu*) for the month Aiaru (ii), in the 10th year of Nabonidus. A similar amount of three talents 38 minas, presumably again for *sattukku* and *pappasu* were issued for the month Araḥsamna? (viii) of the 10th year [of Nabopolassar?] (BM 52636 = GG II 311). This much higher quantity may result from the fact that the wool was destined for the gods' garments as well for other woolen products, such as beds and tablecloths, curtains, carpets, etc. Interesting data are found in BM 65976 = GG II 414 ([Nbk] 19). At the very end of this text, in a slightly broken context, a high quantity of 42 talents 55 minas of wool (the yield of over 1710 sheep) is mentioned, while 9 talents 50 minas is qualified as *sattukku*, and 5 talents 38.5 minas was used for manufacture of the šiddu-curtains of the Ebabbar temple.¹¹⁵ According to BM 50963 = GG II 383, 18

talents 5 [minas] of wool (the yield of about 725 sheep) was given for the disposal of the weaver, presumably for the 15th and 16th years of Nabopolassar. BM 49757 = GG II 348 (Nbp 10) is impressive, where out of a total amounting 11 talents 29 minas of wool (the yield of 550 sheep), 2 talents 15 minas of wool was issued for the manufacture of *taḥapšu* cover(s). This spending is quite high, but was presumably out of the ordinary. Additionally, on this basis, it is difficult to estimate not only how many sheep the Ebabbar temple owned and how high the total amount of wool derived was each year. The time span corresponding to the 42 talents 55 minas of wool, one of the highest amounts mentioned (BM 65976 = GG 414) is, however, not precisely given – one year is possible. The highest amount of one hundred talents (c. 3000 kg) – however in a broken context – is mentioned in VS 6, 24, which can be estimated as the yield from 4000 sheep. Although in light of my previous calculation this cannot represent a yield from all sheep owned by the temple,¹¹⁶ even production of wool from such a number exceeded the ongoing needs of the temple for manufacture of the garments of the gods:

To 360,000 shekels (4000 sheeps)

Expenditures:

1. 72,000 shekels (20 talents, the yield of 800 sheep)
2. 30,000 shekels (8 talents, the yield of 333 sheep)
3. 170,000 shekels (the inhabitants of inner city: $119\ 285 \times 10$ minas (47.5, the yield of 1900 sheep)

273,000 shekels (75.8)

387,000 (c. 24.2 talents)

If the above calculations are correct, it means that, for the manufacture of the garments and other woolen elements for the gods, it was enough to shear about 1100 sheep.

Let us compare now these calculations with wool issued to the prebendary weavers for manufacture of the gods' clothes for the *lubuštu* ceremonies:

Weight of woolen items of the gods' clothes issued for *lubuštu* ceremonies:¹²⁰

	kg	Estimated number of sheep	
Aiaru (ii)			
½ talent 3 1/3 mina	16,7	22	BM 64594 = GG II 643 ¹²¹
1 talent	30	40	BM 83677 = GG II 404
[1 talent] 20 minas	40	53	BM 76590+ = GG II 163
1 talent 40 minas	50	67	BM 60900 = GG II 416 ¹²²
Du'uzu (iv)			
1 talent	30	40	BM 61598 = GG II 408
Ulūlu (vi)			
1 talent	30	40	BM 60553 = GGI 417
[1] talent 2 minas	31	41	BM 61228 = GG II 403
1 talent 5 minas	32.5	22	BM 76590+ = GG II 163
1 talent 56 minas 36 shekels	58.3	78	BM 65913 = GG II 591
Tašrītu (vii)			
½ talent	15	20	BM 84470 = GG II 389
[½] talent 3,5 mina	16.7	22	BM 83650 = GGI 408a
½ talent 5 minas	17.5	23	BM 60445 = GG II 392
1 talent 6 minas	33	24	BM 76590+ = GG II 163
Araḥsamna (viii)			
½ talent 3 minas 10 shekels	16.1	22	BM 83650 = GG II 408a
1 talent 15 minas	37.5	25	BM 76590+ = GG II 163
1 talent 50 minas	55	73	Cyr 202 = GGII 485
3 talents 38 minas	109	145	BM 52636 = GG II 311
Addaru (xii)			
½ talent 9 5/6 mina	19.8	27	BM 72963 = GG II 121
1 talent 1 mina	30.5	41	BM 101063 = GG II 428
1 ½ talent + ½ talent		45+15	80BM 75530 = GG II 437
Cf. common data for <i>lubuštu</i> of Addaru and Nisannu			
2 talents	60	80	BM 76590+ = GG II 163
2 talents	60	80	BM 65047 = GG II 393
2 talents	60	80	BM 61011 = GG II 407 ¹²³
2 talents 10 minas	65	80	BM 76590+ = GG II 163

As we can see quite often the amount of wool issued to the prebendary weaver was only a little over half talent, i.e. close to the total weight of the Šamaš' garments. The situation when a higher amount of wool was issued thus needs to be explained. In two texts, dated to the 1st¹²⁴ and 11th years of Nabonidus,¹²⁵ where the weaver was issued 1 talent 13 minas and 55 shekels, the amount is higher because the prebendaries accepted additional obligations, among them the manufacture of the items of Adad weighing over 20 minas. A similar situation appears in BM 75530 = GG II 437, where out of two talents of wool, 1½ talents were used for garments of Šamaš and half a talent for garments of Aya. A much lower amount of 33 minas 10 shekels issued for garments of Šamaš and Aya in BM 83650 = GG II 408a represent presumably only a part of the wool needed. The issue of wool in installments is confirmed by BM 101063 = GG II 428, where 1 talent 1 mina of wool is described as *riḫi lubuštu*, the 'remainder' of the wool for garments for the *lubuštu* ceremony. Evidently the quantities of wool issued to the prebendary weavers concerned only a part of the wool used for the manufacture of gods' clothes. As it was stressed earlier,¹²⁶ although the number of administrative documents on the issuing of wool or those concerning clothes issued from the temple's wardrobe or returned after the ceremony (for which the weight is always given) is enormous,¹²⁷ they represent only a small part of the data concerning the

family who manufactured the garments for Šamaš, and they additionally manufactured some items of clothes for other gods and goddesses on the basis of contracts with these unknown prebendaries. The archives of this family (or families) are as yet unknown, presumably because their documents were stored in a different place.

There is, however, the possibility of calculating the quantity of wool needed for manufacture of these clothes based on the known total weight of garments of Šamaš, compared with other data (Table 21.2).

Starting with the undoubtedly correct assumption that the garments of Šamaš were the most elaborate and consumed the highest quantity of wool, and that the garments of other gods weighed much less,¹²⁸ we can estimate the total demand for wool to no more than 150 minas of wool, c. 2.5 talents. This amount should be increased by about 5% destined to the prebendaries as their prebendary income (*pappasu*), in total about 200 minas, or 3.3 talents, a sum which was obtained from about 135 sheep. If full set of garments would be manufactured each month, the weavers demanded wool from c. 135 sheep per month, or 1600 sheep per year. Although the data did not give any basis to estimate how many new garments of the gods were produced each year, it is not very probable that new ones were manufactured each month or even for each *lubuštu* ceremony, because after only 10 years each god would have 60 sets! Additionally, most of the extant texts do not concern the wool issued for the manufacture of garments, but for garments issued from the wardrobe of the temple in order to be prepared (clean/laundry, mend, etc.) for an approaching ceremony. The aim of such a document giving the exact weight of each item and the quantity of coloured wool used for their manufacture (even in such small amounts as a few shekels) was to prevent any later changes in weight and quality. In general, it seems that new garments or items of the god's clothes were not produced on a regular basis but only when there was a need. Presumably only selected kinds of wool were used for the manufacture of such garments and, if so, production of wool might have been much higher. All this suggests that annual demand for wool for manufacture of the garments of the gods was rather limited and the temple produced much more wool than was needed for cultic aims. However, even if a prebendary weaver manufactured new garments for each *lubuštu* ceremony, they would only use about 20 talents of wool, the yield of only 800 sheep! This means that even wool acquired from the flocks of the *rē'i sattukkē* exceeded the demand of the temple for wool for its cultic purposes. Just as in Uruk, it is out of question that the *rē'i sattukkē* managed only a small part of the temple flocks.¹³⁰

Name of items	Šamaš	Adad	Bunene	Aya	Gula	Anunītu	Šarrat Sippar	mārate Ebabbar
<i>lubbāru</i>	20 m	15 m	1m 20 š	-?	-	-	-	-
<i>kusītu</i>	-	-	-	x	x	-	+	+
<i>šibtu</i>	10 m	5 m	40 š	x	2 m	16 m	-	-
<i>lubbār mē qaqqādi</i>	2m	-	-	-?	-	-	2 m 40 š	-
<i>hūšannu</i>	10 š	-	-	10 š	5 š	10 š	10 š	8 š
<i>nahlaptu</i>	-	-	-	x	4 m	-	+	+
<i>sūnu</i>	20 š	20 š	20 š	20 š	20 š	20 š	20 š	+
Total weight	32 m 30 š	20 m 20 š	2 m 20 š	30 š ¹²⁹	6 m 25 š	16 m 30 š	3 m 10 š	8 š

Table 21.2. Woolen garments of the gods. Data from the texts discussed, in 2006, published, in Zawadzki 2013, abbreviated, as GG II. x means that the item was an element of the garment of the

given god. or goddess but its weight is yet not known; – means that the item is not noted and probably was not an element of the garment of the god. or goddess.

All this leads to the conclusion that the Ebabbar temple had a significant surplus of wool compared to the needs for cultic and non-cultic purposes, and the best way was to sell it on the market, and a few texts confirm such a conclusion.¹³¹ In the 19th year of Nebuchadnezzar (586 BC) the temple used 15 talents 14.5 minas of wool, the yield of about 610 sheep, to pay for 36,800 bricks.¹³² In BM 77847, written shortly before or after BM 61761, the silver equivalent of wool used for paying for bricks can be calculated to have been 3 minas 39 1/4 shekels or 20 shekels less. Later, in the 41st year of Nebuchadnezzar (564 BC) the temple paid with wool for oxen, and the coloured wool used for this was 4 talents 27.5 minas¹³³ of wool, the yield of about 180 sheep.¹³⁴ In the 9th year of Nabonidus (547 BC) the temple sold 30 talents 22.5 minas of wool, the yield of 1215 sheep for 4 minas 33 5/6 shekels, i.e. 6.6 minas for one shekel of silver.¹³⁵ A year later, a similar amount of 30 talents of wool, a yield of 1200 sheep, was bought by two persons for 4.5 minas of silver, i.e. for the very low price of 6.66 minas of wool for 1 shekel of silver.¹³⁶ In the 16th year of Nabonidus (540 BC) the temple sold 10 talents 11 minas of wool, the yield of about 410 sheep for 2 minas 11 shekels i.e. the price was 4.66 minas shekels.¹³⁷ These few cases clearly demonstrate that the temple had quite large surpluses of wool which they used to pay their own or hired workers or which were sold on the market. The lower price of wool from the last decade of Nebuchadnezzar until the end of Nabonidus' rule is good evidence for the considerable surpluses of wool of the Ebabbar temple. The examples of paying rations for temple workers on exceptionally favorable conditions deliver clear evidence that there were surpluses of wool and difficulties with its profitable investment.¹³⁸ Although the data are scanty, it is important to remember that the preserved archive of the Ebabbar temple concerning wool is almost entirely focused on activities related to the cult. Presumably the tablets concerning wool used for non-cultic purposes were in a separate collection, which was either destroyed or is still waiting to be discovered.

If – as I argued above – there is no reason to think that the temple suffered a shortage neither of sheep nor wool, it is surprising that in the 'early garment texts'¹³⁹ the older standard for weight and presumably sometimes for the number of items¹⁴⁰ are not observed. To explain this, let us first describe the form and content of each of the three categories of the 'garment texts'. In the 'early garment texts' the total weight of all the items is given first, then their names, sometimes with a precise indication of their number, sometimes without this indication. The weight of a single item is given only exceptionally, and usually concerns the items produced for less important gods and at the order of other prebendaries. The second type of texts that I described as 'Texts from the time of Nabû-bêl-šumâti',¹⁴¹ because in all of them he is the active person – would be better to name as 'early tabulated texts'. The first such documents appear at the very beginning of Nebuchadnezzar's rule, and presumably they were in use until his 22nd year.¹⁴² They have elements of the first and third groups: as in the first group, the total weight of all items is given, although not at the beginning but at the very end of the text. They are similar to the third group in this respect, that the weight of each item (and its number) is given. The third type of documents which might be called 'classical tabulated texts' are known from the very beginning of Nabonidus until

the end of the Sippar archives (end of Darius I). There each item of divine cloth is described in a separate line, isolated from the previous and following items by ruled lines. Usually not only the weight but also the number of items is precisely given. It is important that the weight and number of all items of divine attire are always the same.¹⁴³

If we wish to check if, in the earliest period (the time of Nabopolassar), the above described norms were observed we need to substitute the number of element(s) by their weight and next compare the calculated weight with the weight given at the very beginning of the document, see for example

BM 50272 = GG II 1

1. 30 5/6 *ma-na dul-lu gam-ru*
2. KL.LAL TÚG.ĦLA *u* TÚG.MÁŠ šá^dUTU
3. *lu-bar ziq- <qu>* 3 ^{tú}gsu-ni-e
4. TÚG.NÍG.ĦB.LÁ.MEŠ šá^dUTU *u* ^dAA-a
5. ^dGAŠAN *Sip-par*^d TÚG.ĦLA *u* TÚG.MÁŠ
6. [šá] ^dBu-ne-ne

“30 minas 50 shekels, the completed work, the weight of the *lubāru* and *šibtu* garments of Šamaš, the *lubār ziqqu*-garment, 3 *sūnu*-belts, sashes for Šamaš and Aya (and) the Queen of Sippar; the *lubāru* and the *šibtu*-garments for Bunene.”

Knowing that 1 *lubāru* (TÚG.ĦLA) weighed 10 minas, two *šibtus* (TÚG.MÁŠ) – the norm for the month Nisannu of Šamaš – 20 minas, one *lubār ziqqu* – 2 minas,¹⁴⁴ 3 *sūnus* – 1 mina, 7 *hušannus* of Šamaš and 20 *hušannus* Aya and Šarrat Sippar – total 3 minas 10 shekels, and *lubāru* and *šibtu* of Bunene – 2 minas, the grand total is 38 minas 10 shekels, that is 7 minas 40 shekels over the declared total of line 1 (Table 21.3).

Apart from no. 8, where the declared weight of items is 10 shekels higher than expected, in all other texts the declared weight of items is lower, sometimes significantly. The differences are especially important in cycle A (see for example nos 1, 3, 16, 644, 22, 26, 28, and 29 of the Table). Small differences might be explained by the fact that the total weight is sometimes comprised only of white wool. This is suggested by a few texts where the total weight of *lubāru* and *šibtu* of Bunene is 1 mina 55 shekels,¹⁴⁵ instead of 2 minas, however we know from other texts that 5 or 6 shekels of blue-purple wool was used to manufacture his *lubāru*, i.e., the total was again 2 minas.¹⁴⁶ Because the addition of coloured wool was low (in *lubāru* of Šamaš 30 shekels, of Adad 20 shekels, of Bunene only 5 or 6 shekels),¹⁴⁷ higher discrepancies between declared and expected weights must have arisen for different reasons.

The explanation of more important discrepancies between the declared and calculated weights is provided by the observation of weights of items in the ‘early tabulated documents’, especially of *šibtu* and *lubār ziqqu*. According to the old norm known from the copy written at the end of 7th century BC from the original tablet from the 9th century BC, the temple received four *šibtus* in the cycle A and 3 *šibtus* in the cycle B, each weighing 10 minas. This norm was changed after the restoration of the Chaldean monarchy in this way that the new norm was two *šibtus* in cycle A and only one in cycle B. In the ‘early tabulated texts’ the weight of *šibtu* was lower: 7₁₆₀ or 8₁₆₁ minas, and presumably the situation was the same in the time of Nabopolassar’s rule. The weight of the second item *lubār ziqqu*, which received the new name *jubār mē qaqaadi* or *lubār damqa*,¹⁶² in ‘early tabulated

texts’ is higher, usually over 5 minas,¹⁶³ compared to the later classical tabulated texts (where it is 2 minas). This suggests that the traditional old norm was rather two than five minas as observed in the early tabulated documents. In particular, the great difference between the given and calculated weight in some texts in cycle A suggests that not only the weight of each *sibtu* was below the norm, but that only one such item was issued. This finds expression in writing, i.e. (TÚG). MÁŠ where the weight is significantly too low, and (TÚG).MÁŠ.MEŠ or 2 (TÚG) MÁŠ.MEŠ or 2 (TÚG) MÁŠ,¹⁶⁴ when there is no difference between declared and calculated weigh or when the difference is small.

No. of the text in GG II, month and the king's year	Cycle	The quantity given in the text	The quantity estimated on the basis data known from 'classical texts'
no. 1 (8.Nbp 9)	A	30 m. 50 š	38 m. 10 š
no. 3 (1.Nbp 17)	A	35 m.	47 m 30 š ¹⁴⁷
no. 4 (12.<Nbp> 15)	B	34 m.	35
no. 5 (6.Nbp 18)	B	[3]7 m 30 š	38 m 20 š ¹⁴⁸
no. 6 (12.Nbp 18)	B	35 m 30 š	37 m 20 š
no. 7 (Nbp 20)	B	36 m	37 m 20 š
no. 8 (12.Nbp 20)	B	35 m 30 š	35 m 20 š ¹⁴⁹
no. 9 (8.Nbp x)	B	35 m	47 m (30) š ¹⁵⁰
no. 11 (7.Nbk 2)	B	[3]r9 ⁷¹ m 30 š	36 m 20 š ¹⁵¹
no. 16 (1.Nbk 8)	A	35 m	47 m 30 š
no. 644 (1.Nbk 12)	A	31	45 m 30 š ¹⁵²
no. 18 (6 ⁷ .Nbk 9)	B	35 m 30	37 m 20 š ¹⁵³
no. 19 (6.Nbk 10)	B	37 m	37 m ¹⁵⁴
no. 21 (2.Nb[k x])	A	46 m 30 š	45 m 30 š ¹⁵⁵
no. 22 (8.Nbk [x])	A	35 m 30 š	46 m 30 š
no. 26 (2.Nbk [x])	A	40 m	47 m 30 š ¹⁵⁶
no. 28 (1 ⁷ .[KN x])	A	36 m	46 m 30 š
no. 29 [KN x]	A	34 m 30 š	46 m 30 š ¹⁵⁷
no. 30 [KN x]	A	42 m46 m 30	45 m 30 š ¹⁵⁸

Table 21.3.

Summing up, because in the ‘early garment texts’ only total weight of items is given, it was impossible to check if the manufacturer (the prebendary or his performer) observed the weight of each item. As long as this form of accounting was in use a person inspecting the document did not know exact weight of each item and – as we know – some of them weighed over or below the norm. As it is certain that the weavers did not steal the wool (total weight of all issued items is given) this means that they concentrated their attention more on shape of garment than on its weight. However, the authorities of the temple expected that not only shape but also weight of each item would be strictly observed and for this reason the new type of document, called ‘early tabulated texts’, was introduced. This presumably took place at the very beginning of Nebuchadnezzar’s reign, at the same time when the changes in the local Sipparean pantheon were introduced.¹⁶⁵ Only in the third category of documents are the norms known from the Neo-Babylonian copy of an older document strictly observed. Because of the lack of data for the period after the 22nd year of Nebuchadnezzar until the accession year of Nabonidus, it is difficult to say whether the observance of these old norms had already been introduced by Nebuchadnezzar¹⁶⁶ or one of his successors, or only by Nabonidus. However, as Nabonidus presents himself as a person who restored old standards and customs,¹⁶⁷ it seems that the restoration of older norms in respect of the weight and maybe the shape of the gods’ garments should be ascribed to him. The process of standardization of weight was lengthy and ended in the last decades

of Nebuchadnezzar or later, in the time of Nabonidus.

Sheep husbandry and wool played an important role in the economy of the Ebabbar temple at Sippar. Although it seems that wool of the best quality was used for the manufacture of the garments of the gods and woolen items belonging to the equipment of the chapels, or used during ceremonies, the data suggest that the total production of wool importantly exceeded these demands. Surplus wool was allocated in part in an internal economy, but despite the fact that relevant documents are scarce, they indicate that the wool trade was an important source of income for the Ebabbar temple. The difference between Sippar and Uruk lies mostly in size: the temple household of the Ebabbar temple was several times smaller than that of the Eanna temple at Uruk.

Abbreviations

AfO *Archiv für Orientforschung*

AnObI, P. A., *Neubabylonische Rechtsurkunden aus den Berliner Staatlichen Museen* I. *Analecta Orientalia* 8. Roma 1933.

AOAT *Alter Orient und Altes Testament*

ArOr *Archiv Orientalni*

BaM *Baghdader Mitteilungen*

Bertin published copies of BM tablets by G. Bertin

BMsiglum of tablets in the British Museum

BSA *Bulletin on Sumerian Agriculture*

CMC *Cuneiform Monographs*

CTB *Facsimiles, Th. G., Cuneiform Texts from Babylonian Tablets in the British Museum*, London 1982, prepared for publication by I. L. Finkel.

CyrStrassmaier, J. N., *Inschriften von Cyrus, König von Babylon (538–529 v. Chr.)*. Bd 7. Leipzig 1890.

GGZ *Gzawadzki, S. Garments of the Gods. Texts. OBO 260. Fribourg-Göttingen. 2013.*

HSAT *Haidelberger Studien zum Alten Orient*

HSM *siglum for tablets in the Harvard Semitic Museum, Cambridge MA*

JCS *Journal of Cuneiform Studies*

NABU *Nouvelles Assyriologiques Brèves et Utilitaires*

NbI *Strassmaier, J. N., Inschriften von NABUchodonosor, König von Babylon (604–561 v. Chr.)*. Bd 5–6. Leipzig 1889.

NbI *Strassmaier, J. N., Inschriften von Nabonidus, König von Babylon (555–538 v. Chr.)*. Bd 1–4. Leipzig 1889.

NCBS *siglum for the tablets in the Newell Collection of Babylonian Tablets, Yale University, New Haven.*

OBO *Orbis Biblicus et Orientalis*

PIHANS *Publications de l'Institut historique-archéologique néerlandais de Stamboul, Istanbul-Leiden* 1956-

SAK *Schuberhuber, K., Sumerische und akkadische Keilschrift Denkmäler des Archäologischen Museums zu Florenz. Innsbruck 1960.*

Or *Orientalia*, Nova Series

TCL *siglum for the texts from Textes Cuneiformes du Louvre.*

TCL *Contenau, Contrats néo-babyloniens, vol. 2: Achéménides et Séleucides (TCL 13), Paris 1929.*

UCP *Ullrich, H. F., Neo-Babylonian Administrative Documents from Erech. Berkeley and London 1927.*

WZKM *Wiener Zeitschrift für die Kunde des Morgenlandes*

YO *Yale Oriental Series, Babylonian Texts .*

YOS *Clay, A. T., Miscellaneous Inscriptions in the Yale Babylonian Collection. New Haven and London* 1915.

YBS *siglum for the tablets in the Yale Babylonian Collection, New Haven.*

ZA *Zeitschrift für Assyriologie und Vorderasiatische Archäologie*

Bibliography

- Abraham, K. (2004) *Business and Politics under the Persian Empire. The Financial Dealings of Marduk-nāšir-apli of the House of Egibi (521–487 BCE)*. Bethesda.
- Baker, H. (2004) *The Archive of the Nappahu Family*, AFO Beiheft 30. Wien.
- Beaulieu, P.-A. (1989) *The Reign of Nabonidus, King of Babylon. 556–539 BC*. New Haven and London.
- Beaulieu, P.-A. (2003) *The Pantheon of Uruk during the Neo-Babylonian Period*. CM 23. Leiden-Boston.
- Bongenaar, A. C. V. M. (1997) *The Neo-Babylonian Ebabbar Temple at Sippar: its Administration and its Prosopography*. PIHANS 80. Istanbul.
- Cocquerillat, D. (1969) *Palmeraies et cultures de l'Eanna d'Uruk*. Ausgrabungen der Deutsch Forschungsgemeinschaft in Uruk-Warka, Bd 8. Berlin.
- Dandamayev, M. A. (1984) *Slavery in Babylonia from Nabopolassar to Alexander the Great (626–331 BC)*. DerKalb.
- Evetts, B. T. A. (1892) *Inscriptions of the Reigns of Evil-Merodach, Neriglissar and Laborosoarchod (Bd 6 B)*, Leipzig.
- Joannès, F. (1982) *Textes économiques de la Babylonie récente*. Paris
- Joannès, F. (1989) *Archives de Borsippa: La famille Ea-ilūta-bani: Étude dun lot d'archives familiales en Babylonie du VIIIe au Ve siècle av. J.-C.* Genève.
- Jursa, M. (1995) *Die Landwirtschaft in Sippar in neubabylonischer Zeit*. AFO, Beiheft 25. Wien.
- Jursa, M. (1998) *Der Tempelzehnt in Babylonien vom siebenten bis zum dritten Jahrhundert v. Chr.* AOAT 254. Münster.
- Jursa, M. (1999) *Das Archiv des Bēl-rēmanni*. PIHANS 86. Leiden
- Jursa, M. (2004) *Auftragsmord, Veruntreuung und Fälschungen: Neues von Gimillu*, WZKM 94, 109–132.
- Jursa, M. (2005) *Money-based Exchange and Redistribution: The Transformation of the Institutional Economy in first Millennium Babylonia*. In Ph. Clancier et al. (eds), *Autour de Polanyi: Vocabulaires, théories et modalités des échanges*, 171–186. Colloque de la Maison René-Ginouès 1. Paris.
- Jursa, M. (2010) *Aspects of the Economic History of Babylonia in the First Millennium BC. Economic History, Economic Mentalities, Agriculture, the Use of Money and the Problem of Economic Growth with Contributions by J. Hackl, B. Janković, K. Kleber, E. E. Payne, C. Waerzeggers and M. Weszeli*. Veröffentlichungen zur Wirtschaftsgeschichte Babyloniens im 1. Jahrtausend v. Chr., Bd 4. Münster.
- Kleber, K. (2012) *Famine in Babylonia. A Microhistorical Approach to an Agricultural Crisis in 528–526 BC*, ZA 102, 212–244.
- Kozuh, M. G. (2006) *The Sacrificial Economy: On the Management of Sacrificial Sheep and Goats at the Neo-Babylonian/Achaemenid Eanna Temple of Uruk (c. 625–520 BC)*. Unpublished PhD.dissertation University of Chicago.
- Lanz, H (1976) *Die neubabylonischen ħarrānu-Geschäftsunternehmen*. Berlin.
- Leichty, E. (1986) *Catalogue of the Babylonian Tablets in the British Museum*. Vol. 6: *Tablets from Sippar 1*. London.
- Leichty, E., and Grayson, A. K (1987) *Catalogue of the Babylonian Tablets in the British Museum*. Vol. 7: *Tablets from Sippar 2*. London.
- Leichty, E., J. J. Finkelstein and Walker, C. B. F. (1988) *Catalogue of the Babylonian Tablets in the British Museum*. Vol. 8: *Tablets from Sippar 3*. London.
- MacGinnis, J.(1994) *The Royal Establishment at Sippar in the 6th Century BC*. ZA 84, 198–219.
- MacGinnis, J. (1995) *Letter Orders from Sippar and the Administration of the Ebabbara in the Late-Period*. Poznań.
- MacGinnis, J. (2004) *Servants of the Sun God: Numbering the Dependents of the Neo-Babylonian Ebabbara*. BaM 35, 27–38.
- Petschow, H. (1956) *Neubabylonisches Pfandrecht*. Berlin.
- Ries, G. (1976) *Die neubabylonischen Bodenpachtformulare*. Berlin
- Robbins, E. (1996) *Tabular Sacrifice Records and the Cultic Calendar of Neo-Babylonian Uruk*. JCS 48, 61–87.
- San Nicolò, M. (1933) *Parerga Babyloniaca IX: Der Monstreprozess des Gimillu, eines širku von*

- Eanna. *ArOr* 5, 61–77.
- San Nicolò, M. (1948) Materialien zur Viehwirtschaft in den Neubabylonischen Tempeln I. *Or* 17, 273–293.
- San Nicolò, M. (1949a) Materialien zur Viehwirtschaft in den Neubabylonischen Tempeln II. *Or* 18, 288–306.
- San Nicolò, M. (1949b) Zur Verproviantierung des kgl. Hoflagers in Abanu durch Eanna-Tempel in Uruk. *ArOr* 17, 323–330.
- San Nicolò, M. (1950) *Die Neubabylonischen Lehrvertrag in vergleichender Betrachtung*. München.
- San Nicolò, M. (1951) Materialien zur Viehwirtschaft in den Neubabylonischen Tempeln III. *Or* 20, 351–382.
- San Nicolò, M. (1954) Materialien zur Viehwirtschaft in den Neubabylonischen Tempeln IV. *Or* 23, 351–382.
- San Nicolò, M. (1956) Materialien zur Viehwirtschaft in den Neubabylonischen Tempeln V. *Or* 25, 24–38. 1955.
- Stolper, M. (1985) *Entrepreneurs and Empire. The Murašû Archive, the Murašû Firm, and Persian Rule in Babylonia*. PIHANS 54. Leiden.
- Tarasewicz, R. (2008) *Gospodarka hodowlana świątyni Ebabbar w Sippar w okresie nowobabilońskim i wczesnoperskim* [= Animal Husbandry in the Ebabbar Temple at Sippar in the Neo-Babylonian and Early Persian Period]. Unpublished dissertation, Poznań.
- Tremayne, A. (1925) *Records from Erech. Time of Cyrus and Cambyses (538–521 BC)*. YOS 7. New Haven and London.
- Van Driel, G. (1993) Neo-Babylonian Sheep and Goats. *BSA* 7, 219–258.
- Van Driel, G. (2002) *Elusive Silver: in Search of a Role for a Market in an Agrarian Environment: Aspects of Mesopotamia's Society*. PIHANS 95. Leiden.
- Vargyas, P. (2001) A History of the Babylonian Prices in the First Millennium BC. I. Prices of the Basic Commodities. *HSAO* 10. Heidelberg.
- Waerzeggers, C. (2000/2001) *Het archief van Marduk-rēmanni. Studie van de familie Sāhit-ginē in Nieuwbabylonisch Sippar (548–484 v. Chr.)*. Unpublished PhD. dissertation, University of Ghent.
- Waerzeggers, C. (2010) *The Ezida Temple of Borsippa: Priesthood, Cult, Archives*. Achaemenid History 15. Leiden.
- Wunsch, C. (1993) *Die Urkunden des babylonischen Geschäftsmannes Iddin-Marduk. Zum Handel mit Naturalien im 6. Jahrhundert v. Chr.* (CM 3A and CM 3B). Groningen.
- Wunsch, C. (2000) *Das Egibi-Archiv. Die Felder und Gärten*. (CM 20A and 20B). Groningen.
- Wunsch, C. (2003) *Urkunden zum Ehe-, Vermögens-, und Erbrecht aus Verschiedenen Neubabylonischen Archiven*. Dresden.
- Zawadzki, S. (2001) New Data Concerning High Officers from the Neo-Babylonian Period. *NABU* 2001/60.
- Zawadzki, S. (2003) Bookkeeping Practices at the Eanna Temple in Uruk in the Light of the Text NBC 4897. *JCS* 55, 99–123.
- Zawadzki, S. (2006) *Garments of the Gods: Studies on the Textile Industry and the Pantheon of Sippar according to the Texts from the Ebabbar Archive*. OBO 218. Fribourg-Göttingen.
- Zawadzki, S. (2013) = GG II.
- Zawadzki, S. (in press) The Economy of Cult and the Neo-Babylonian Palace. In *Palatial Economy in the Ancient Near East and in the Aegean: First Steps Towards a Comprehensive Study and Analysis*. ESF Exploratory Workshop Convened by Pierre CARLIER and Francis JOANNÈS, Sèvres (France), September 17–18, 2010.

1 The title of this paper quotes the Polish proverb “Kto ma owce, ten ma co chce”.

2 San Nicolò 1948, 1949a, 1949b, 1951, 1954, 1956.

3 Cocquerillat 1968.

4 See San Nicolò 1950, Petschow 1956, Ries 1976 and Lanz 1976.

5 First series of highly important articles, enlarged and summarized in Van Driel 2002.

6 Joannès 1982, 1989.

7 Dandamayev 1984.

8 Stolper 1985.

9 CT 55–57.

10 Leichty *et al.* 1986–88.

- 11 MacGinnis 1995
- 12 Bongenaar 1997.
- 13 Wunsch 1993, 2000, 2003.
- 14 Jursa 1995, 1998, 1999.
- 15 Vargyas 2001.
- 16 Abraham 2004.
- 17 Kozuh 2006.
- 18 Baker 2004.
- 19 Waerzeggers 2000/2001 and Waerzeggers 2010.
- 20 Jursa 2010.
- 21 Jursa 2010, 516, table 59. In one of these documents (Nbn 733) the number of sheep bought is not preserved, however the sum of 1.5 mina can be compared with 48 sheep bought in the same year for 1 mina 40 shekels (HSM 1891.11.8 there).
- 22 Now BM 63447 + 2 fragments joined by R. Tarasewicz that cover over 90% of the original tablet.
- 23 See, for example, Kozuh 2006, 129, 136, who translates the term as ‘offering shepherd’ and Tarasewicz 2008, who describes them as ‘managers of the animal offerings’ and stresses that they were not real shepherds but the person responsible for the smooth functioning of the animal offerings.
- 24 To be published by R. Tarasewicz. I am thankful to him for the possibility to mention the document here. The text, presumably a memorandum or a type of letter order, is not dated, but obviously it was written in the time of Darius. The lack of data makes it impossible to determine if it was written before or after year 8 of Darius, after which, as it was observed by MacGinnis 1994, 214, *niqē šarri* are no longer mentioned.
- 25 It means that numerous sheep belonging to the royal palace grazed on the territory of Rašappa.
- 26 The possibility that a function of the offerings of the king was to compensate a shortage of animals for offerings have to be excluded because in such a situation the purchase of sheep for offerings should not have taken place or should have occurred extremely rarely.
- 27 The income of Eanna from the sale of wool was 60 kg (2 talents) of silver in 16th year of Nebuchadnezzar (589 BC), 26 kg in 18th year (587 BC) but this year the temple was also paid for wool in barley, and more than 139 kg in the 20th year (585 BC), see Jursa 2005, 181. The profit of 2 talents or 7200 shekels of silver, can be made by selling 28,800 minas or 1.728.000 shekels of wool. Assuming that 4 minas of wool were sold for one shekel of silver and that the temple yield from one sheep was equal to 1½ minas, or 90 shekels, the temple must have sold wool produced by 19,200 sheep. In the last example 139 kg, i.e., c. 278 minas or 16,680 shekels of silver is the income from selling of 667,200 shekels of wool, the yield of 44.450 sheep (Jursa calculate this for c. 66,000 sheep assuming that the yields from one sheep was lower, ca. 1 mina).
- 28 Again such interpretation is reminiscent of an observation by P.-A. Beaulieu, that in Uruk, in accordance with Nebuchadnezzar’s inscription an increase in the number of the animals offerings is recognized, see Beaulieu 2003, 86. It seems highly unlikely that the temple did not know how many sheep would be issued by the king.
- 29 The document does not suggest that sheep were purchased in one transaction; the opposite opinion is supported by the purchases dated to the period, given in Jursa 2010, 516, table 59.
- 30 Jursa 2010, 737 (Cyr 122, 125, 152) and two additional documents in Tarasewicz 2008, 304.
- 31 The question will be discussed in the unpublished dissertation of R. Tarasewicz.
- 32 Van Driel 1993, 227.
- 33 The best example is given by the activities of Gimillu in Uruk in the period of transition of power from Nabonidus to Cyrus, i.e. during the last regnal year of Nabonidus (17th), the accession year and part of the first year of Cyrus. Gimillu committed a series of thefts of the temple’s sheep, San Nicolò 1933, 61–77 and Jursa 2004, 111–114.
- 34 See Robbins 1996, 61–87. A few unpublished texts are housed in the British Museum; the data from them are included in the table in this article.
- 35 See Kozuh 2006, 199 who suggests that “the appearance of carcasses in the tabular sacrifice records compels us to believe that they played some part in the *sattukku* ritual at the Eanna.”
- 36 Add # [an indication of one dead sheep in Robbins’ article] to 27th day in Robbins’ table on 71, see photo, 86.
- 37 Courtesy of R. Tarasewicz.
- 38 Only the data for 24 days (some still partly reconstructed) are preserved. Note that the scribe omitted the data for the 9th day.
- 39 Data for only 18 days are preserved.
- 40 Data for only 19 days are preserved.
- 41 According to Robbins’ table no data for last 30th day were given.

- ⁴² Data for only 19 days are preserved.
- ⁴³ Data for only 24 days are preserved plus data about 4 dead sheep from three days.
- ⁴⁴ Courtesy of R. Tarasewicz.
- ⁴⁵ Data for three days are destroyed, and other is partly reconstructed.
- ⁴⁶ The data for 15th and 16th day are damaged (courtesy of J. Maniaczyk collation and his excellent photo).
- ⁴⁷ The data for 7th, and 8th, and 9th days in the *guqqû* column are covered by salt and unreadable (courtesy of J. Maniaczyk collation and his excellent photo).
- ⁴⁸ Add # to 24th day in Robbins' table on p. 71 and replace # from the 29th to 30th day.
- ⁴⁹ Data for two days are damaged.
- ⁵⁰ Data for only 19 days are preserved.
- ⁵¹ Data for only 20 days are preserved.
- ⁵² The reverse of the tablet was kindly collated by J. Maniaczyk, who sent me his excellent photo of this side of the tablet. The results are the following: day 18th and 19th, read 5* (not 6) in the *sattukku* column; day 20 the numeral 5* is missing in the *sattukku* column; day 23rd, add numeral 1* in the second column (dead *sattukku* sheep); for 24th day, delete numeral in the second column (dead *sattukku* sheep).
- ⁵³ Data for only 27th days are preserved.
- ⁵⁴ Data for all days are preserved.
- ⁵⁵ Data for one day (14th) is destroyed.
- ⁵⁶ Note the extremely small number – only one sheep per day – which might explain the lack of losses.
- ⁵⁷ Note that according to the copy of A. T. Clay, the text was written in the month Nisannu, which is corrected by Robbins, 63 and table 3, p. 70. The photo of the tablet, kindly sent to me by E. Payne, supports Robbins' reading.
- ⁵⁸ The data for three days are destroyed.
- ⁵⁹ Data for only 23 days are preserved. Robbins' readings differ in a few places in comparison to Tremayne's copy: on the 10th day copy suggests 9 *guqqû* sheep, while Robbins reads 7; on the 11th day Tremayne's copy suggests 6 (or maybe even 9) *sattukku* sheep, while Robbins reads 5; on 16th day Tremayne's copy suggest 29, while Robbins reads 28. Note also that 9 sheep for the 25th day written in the *sattukku* column might denote total number of sheep for *sattukku* as well as for *guqqû* because this might be compared to 6 sheep for *sattukku* and 3 sheep for *guqqû* issued for the 23rd, 24th, and 27th until 30th. Presumably all sheep for this day were of the same quality and might be sacrificed for *sattukku* as well for *guqqû* offerings. The small difference in total for *sattukku* and *guqqû* in my table results, in comparison to the Robbins counting (see p. 67), from my acceptance of Tremayne's copy in some places. Note that on p. 67 Robbins mentions 8 carcasses but in the table she marks 7 in *guqqû* column (so also Tremayne) and 2 in *sattukku* column.
- ⁶⁰ The data for 24 days, plus in one day about one dead sheep, are preserved.
- ⁶¹ Data for 23rd and 24th are not preserved.
- ⁶² Note the extremely small number of sheep for *guqqû* offering (one sheep per day with exception of 2 sheep for 1st and 8th day) might explain the lack of losses.
- ⁶³ As in Robbins, 63.
- ⁶⁴ As in Robbins, 63.
- ⁶⁵ There are differences between Clay's copy and the data in the table in the article by Robbins. The comparison based on an excellent photo delivered to me very kindly by E. Payne shows that Robbins' reading is more accurate, with five changes: on the 5th day only 4 *guqqû* sheep (not 5); on the 11th day two dead *guqqû* sheep; on the 13th day I read [5] in *sattukku* column; no dead sheep on the 28th day; 4 \$ is a misprint for 4# on the 28th day. It means that my counting is based on Robbins with the Aforementioned changes.
- ⁶⁶ Partly broken, if the data in Robbins' table are accurate, the lists differ in respect to 29th day. Change in YBC 3969, the 29th day: 5 sheep (not 4) for *sattukku* (see photo in Robbins' article). Data for only 22 days, partly reconstructed by Robbins, are counted here.
- ⁶⁷ Data for only 22 days, partly reconstructed, are counted here.
- ⁶⁸ Courtesy of R. Tarasewicz.
- ⁶⁹ The data for five days are completely destroyed, others are partly reconstructed. Note that the data for 9th days are omitted by scribe.
- ⁷⁰ For 6th and 8th day no sheep were counted. For the 5th, 7th and 9th day only data about losses are preserved.
- ⁷¹ Courtesy of R. Tarasewicz. The atypical heading *udu.nita sá.dug4 pa-ra[s ta ...] /šá iti.gan mu.7.kam dag-[im.tuk]u* suggests that sheep were destined for *sattukku* offerings.
- ⁷² Total is given in the last line of the document.

- ⁷³ Robbins did not include the number for the 29th day (at least 3 sheep), for the 30th day on the basis of the Daugherty's copy the reading of 8 sheep is most probable.
- ⁷⁴ Robbins reads 6 sheep for 17th day while copy suggests 9, for the 29th day 8 sheep are counted and on the 30th day the most probable reading is 8 sheep.
- ⁷⁵ Add # to the 26th day in Robbins' table on p. 71.
- ⁷⁶ Data for only 17 days are preserved.
- ⁷⁷ The data for 24 days are preserved; the data for four days are reconstructed by Robbins.
- ⁷⁸ The text was kindly collated by J. Maniaczyk. According to his collation (confirmed by excellent photos) in line 15 (11th day) the number of *guqqû* sheep, slightly damaged but readable is 4. In l. 29 (25th day) in the first column the rest of three wedges in the upper row and one wedge in the lower row are preserved. The position of the last one makes it possible to read 4 as well as 5. Because five sheep for *sattukku* is typical, the reading 5 is preferred. In l. 30 (26th day) in the first column the rest of the numeral [5] is visible (two wedges in the lower row). In l. 34 (30th day) concerning sheep given for inspection (*ana amāru*) in the first column two vertical wedges (as in the second part of an *a* sign) are preserved, which makes it possible to read [5], as in previous lines in this column. In the second column only a 'head' of one wedge in upper position and tiny end of one wedge at the bottom is preserved, which makes it possible to read [4] as in previous lines in this column.
- ⁷⁹ Robbins 1996, 85.
- ⁸⁰ Data for only 20 days are preserved.
- ⁸¹ Data for only 24 days are preserved.
- ⁸² Data for only 24 days are preserved.
- ⁸³ Data for the period from 13th to 17th day are destroyed.
- ⁸⁴ Data for only 21 days are preserved. Add # to 6th day in Robbins' table on p. 70.
- ⁸⁵ Data for the period from 15th to 17th day are destroyed.
- ⁸⁶ Add # to 16th day in Robbins' table on p. 71.
- ⁸⁷ Courtesy R. Tarasewicz.
- ⁸⁸ The duplicate YOS 7, 50 and YBC 3980 and BM 114535 are not taken into account.
- ⁸⁹ The only exception is YBC 3976 where losses of *sattukku* sheep are higher (20) than of *guqqû* sheep (12), however, if we take into account the percentage of lost sheep from the total number of sheep in each group, the result is different: 20 dead sheep out of 210 for *sattukku* is only 9.5%, while 12 *guqqû* sheep out of 77 is 15.6%, however presumably a little less as some data in *guqqû* column are not preserved. There is still a small probability that the percentage losses were higher in the first group.
- ⁹⁰ With the exception of AnOr 8, 72 (dated month of Addaru, 3rd year of Cambyses), where 728 sheep are counted, much more than in other lists. This is influenced by the high numbers of offerings for several days, i.e. from the 2nd to the 6th day and on the 20th day, i.e. during six days 498 sheep, much more than two-thirds of the offerings for the month, were sacrificed. Might we recognize it as a kind of atoning sacrifice made at difficult time to appease the gods' wrath?
- ⁹¹ Noted already by Robbins, 66.
- ⁹² Presumably they took place in the fattening house shortly before their intended slaughtering in the near future and were quickly replaced.
- ⁹³ In AnOr 8, 69 only on the 1st and 8th day two sheep were delivered.
- ⁹⁴ Similarly already Robbins, 66, and n. 26, who thinks that sheep in the common lists were issued entirely from the urû-stable.
- ⁹⁵ Kleber 2012.
- ⁹⁶ No data about prices of the main commodities from these years are available.
- ⁹⁷ Robbins, 65.
- ⁹⁸ See above, nn. 45–46, 51 and 77.
- ⁹⁹ There is no sense checking the sheep after the day of the ceremony when they were sacrificed to the gods.
- ¹⁰⁰ Commented on by Jursa 2010, 515, and Tarasewicz 2008, 290–91 (I have my own transliteration of the document) who discusses these transactions in terms of price. I shall focus my attention on recognizing the reasons for the decision, which at first glance seems to be the opposite of that expected.
- ¹⁰¹ According to Kozuh 2006, 170 "viable female sheep were too valuable to sacrifice".
- ¹⁰² Especially as 90% involved a small number of sheep.
- ¹⁰³ See Jursa 2010, 616–617.
- ¹⁰⁴ Wherever we know who bought the sheep for offerings, it is 'the herdsmen of the regular offerings' or persons authorized by them, for example during the first three years of the rule of Nabonidus – as was established by R. Tarasewicz, sheep were bought by two shepherds who acted together with *rē'i sattukkē* or separately, but never with the title of *rē'i sattukkē*.
- ¹⁰⁵ Presumably also for this reason, the experiment to deliver sheep for *guqqû* offering in Uruk in the

3rd and 4th year of Cambyses was abandoned.

106 The annual settlement of accounts with the *rē'i sattukkē* for the period from Tašritu do Araḥsamna suggests that their direct contact with the temple's accountants took place at a different period than with other shepherds, whose flocks were counted mostly in the second and third months of the year.

107 Concerning the development of sheep herds, reproduction and the replacement of the older sheep, see Zawadzki 2003, 104–108.

108 See Van Driel 1993, 224 and Jursa 2010, 257.

109 See Van Driel 1993, 222–23, 253.

110 I was able to study this text during my last visit in the British Museum in April 2012.

111 Evetts 1892, appendix, no. 2 (BM 72764). See also Zawadzki (in preparation).

112 See Zawadzki (in press).

113 The minimal production of wool in Uruk can be estimated for about 1250 talents, or 37.500 kg or 37.5 tons, assuming that from about 100,000 sheep only adult sheep were sheared, i.e. about 50,000 sheep × 90 shekels per sheep.

114 GG II + number denote the document published Zawadzki 2013.

115 This suggests that manufacture of such items like curtains were not included to the prebendary obligation.

116 Based on data concerning offerings of sheep in the Ebabbar temple, the number of sheep sacrificed might be estimated at more than 5000 sheep, and a total number of over 20,000 (for this estimation, see n. 37 in Zawadzki (in press)).

117 See, however, below.

118 Calculated on the basis of the two highest issues of wool for manufacturing *taḥapšu* and *šiddu*, presumably an exceptional situation.

119 According to the calculation of MacGinnis 2004, 36.

120 There are no data for the first, third, fifth, ninth, tenth and eleventh months.

121 However, it is only the first part of the issued wool as the text mentions also [x] talent 2 minas (which might be reconstructed as $\frac{1}{2}$ or 1 talent)] given for the same month to a different person, i.e. the lowest total would be no less than 1 talent 5 $\frac{1}{3}$ mina. Note also 1 talent 2 minas for a *taḥapšu* blanket.

122 Cf. 1 talent 40 minas *dullu* iti.[x] in BM 83281 = GG II 429.

123 Term used instead of *lubuštu*.

124 BM 58082 = GG II 76.

125 BM 59723 = GG II 85.

126 Based on the data gathered in Zawadzki 2006.

127 Including badly preserved tablets, there would be about 1500 texts.

128 For example Bunene's garments weighed only a small percentage of the weight of Šamaš's garments, see Zawadzki 2006, 88, tables 20 and 22, table 22.

129 Compare the issue of half talent (15 kg) of wool for *kusitu*, an outer mantle and *naḥlaptu*, and of Aya in BM 75530 = GG II 437.

130 Otherwise, the number of sheep in the Uruk would have to be reduced from about 100,000 as calculated by scholars to about 14,000. According to YOS 7, 8 the *rē'i sattukkē* issued 7036 sheep for offering, however, 1473 sheep were delivered by the king and the king's son, i.e. only 5563 came from flocks under the supervision of the *rē'i sattukkē*. Assuming that 100 ewes gave birth to about 40 male and 40 female lambs, the number of ewes who gave birth to 5563 male lambs and similar number of female lambs can be calculated to 11,126 ewes + 2225 (20%, which did not give birth), in total 13,350, plus the rams, a grand total of about 13,750 sheep.

131 The texts are collected by Jursa *et al.* 2010, 616–617 (table 96) where he established the rate of wool (in minas) per shekel of silver. Here we took into account the number of sheep sheared to get the given amount of wool sold.

132 BM 61761.

133 BM 114784. Assuming that in l. 8 we read [1] talent.

134 3 talents 11.5 mina of wool valued 42.3 shekels of silver. [1] talent 16 minas exchanged for some amount of blue-purple and red wool (*takiltu* and *tabarru*); its weigh is not given.

135 BM 63940 = Bertin 1373.

136 CT 55, 754.

137 Nbn 963.

138 BM 65364 (time of Nabonidus), see Zawadzki (in press), and BM 70316 (time of Darius I), Zawadzki 2001. In both documents cited there, the king's resident received half a talent of wool, or 30 minas, while the norm was 15 minas per month, and workers (relevant data appear also in the second document) 15 minas while the norm was 7.5 minas.

139 Zawadzki 2006, 6–7.

140 Known from the text going back to the 9th century BC (Zawadzki 2006, 140–149) and can be compared with the data from later period (beginning from the time of Nabonidus).

141 Zawadzki 2006, 17–21.

142 In practice no documents of this category are known for the period after the 22nd year of Nebuchadnezzar and before the very beginning of Nabonidus. However, the interpretation of BM 62543 from the 22nd year of Nebuchadnezzar is not unequivocal because of a few evident mistakes by the scribe. First, according to the text two *lubārus* weighing 20 minas were issued, while the norm was always one *lubāru* weighing 20 minas. Next 4 *sūnus*, one *lubār mē qaqqadi* and 7 *hušannus* of Šamaš weighed 3 ½ minas, while we would expect 4 ½ minas, which suggests the norms known from later texts were not yet observed. For these reasons, there is a question whether the issue of 2 *šibtus* weighing 20 minas (which suggests that the norm was already observed) is not a scribal error.

143 In a few known documents the weight is about one to three shekels over the expected norm.

144 In the period beginning from the time of Nabonidus; on its weight in an earlier time, see below.

145 BM 50342 = GG II 21, r. 12'; BM 114751 = GG II 644: 5.

146 Note, however, that sometimes their weight was higher, see S. Zawadzki 2006, 20.

147 Zawadzki 2006, 88, table 20.

148 Or 20 shekels less because in a few texts only 3 *sūnus* are mentioned.

149 Or 20 shekels less because in a few texts only 3 *sūnus* are mentioned.

150 The estimated total is lower because *lubār ziqqu* weighing no less 2 minas is not mentioned in the text.

151 The number of *sūnus* is not known, usually three or four.

152 Concerning mistake in counting in these texts, see commentary to the edition.

153 Only the data from ll. 1–4 are taken into account here. The declared sum is too low in comparison with the known weight of the item in later time. The temple should received one *lubāru* (20 m) + 2 *šibtus* (total 20 m) + one *lubār mē qaqqadi* (2 m) + 7 *hušannus* of Šamaš (1 mina 10 š) + 4 *sūnus* of Šamaš and Aya (1 mina 20 shekels) + 10 *hušannus* of Aya (1 mina), what gives in total 45 minas 30 shekels. Evidently at least one or two of these items weighed in fact less in comparison to the norm.

154 Or 20 shekels less because in a few texts only 3 *sūnus* are mentioned.

155 If four *sūnus* were delivered (the scribe wrote *túg.ūr.meš* avoiding numeral) the total would be 20 shekels higher.

156 The estimated total is lower because *hušannus* of Šarrat Sippar weighing 1 mina is not mentioned in the text.

157 Without one *sūnu* for Adad and Šala weighing 20 shekels.

158 Assuming that garments of Bunene were mentioned in the damaged part of the tablet, or 2 minas less.

159 Without *hušannus* of Aya and Šarrat Sippar, not mentioned in the text.

160 BM 50066 = GG II 295, col. II 4'; BM 50745 = GG II 297, col. II 10', r. col. I 4', col. II 15'; CT 55, 837 = GG II 306: 2'.

161 BM 51099 = GG II 293, r. col. I 4'; BM 51659 = GG II 296, col. II 10'; BM 51563 = GG II 303, col. II 2'; BM 61920 = GG II 305: 2; BM 52636 = GG II 311: 2.

162 Zawadzki 2006, 95–99.

163 5 mina in BM 51563 = GG II 303, col. II 3'; 5 ½ minas in BM 51099 = GG II 2923: 5; BM 50066 = GG II 295: 5'; BM 50745 = GG II 297, col. II, r. 16; 5 minas 40 shekels in BM 61920 = GG II 305: 3, but only 1 mi[na x shekels] in CT 55, 837 = GG II 206: 2'.

164 When the scribe wrote the numeral 2, he usually did not write the plural.

165 Zawadzki 2006, 181–182.

166 Obviously not at the beginning of his rule, when the second type of document began to be used. Cf. note 30 above.

167 See Beaulieu 1989, 127–137, especially 119–121 and 130–31.

22. Fabrics and Clothes from Mesopotamia during the Achaemenid and Seleucid Periods: The Textual References

Francis Joannès

The terminology of clothes in the Babylonian cuneiform documentation from the end of the Achaemenid period and during the Hellenistic times is marked by the use of words which were not frequently found in the Mesopotamian tradition.¹ This initial study based on private documentation, especially marriage contracts or inventories, and Babylonian temples' archives, has the objective of examining whether the traditional distinction between cultic garments and everyday life garments still existed at that time. On the other hand we must try to determine the linguistic references which were used for the designation of clothes: correspondences seem to exist between the Neo-Assyrian and Aramaic vocabulary for clothing with some designations used during the Achaemenid and Hellenistic periods. In fact, from the 4th century onwards, some 'new' clothes' names are probably to be considered as a visible presence in the cuneiform documentation of the languages really spoken at that time in Babylonia.

Since the late 4th century BC, Babylon was integrated into a new area of civilization, which has been established by Alexander the Great and his successors after their conquest of the Persian Empire. Clothing is one of the categories where new denominations may have appeared. This fact may seem to be trivial or minor at first, but it actually appears to be particularly significant in terms of cultural identity. From that point of view, common people in Babylon had quickly noticed some differences between their traditional practices for clothing and those of the Greco-Macedonian newcomers:

- Anointing oil: "Year 149 SE, Antiochus (V) king, month Tašrītu day x., the Greeks, as they are called, the *politai*, who in the past at the command of king Antiochus (the fourth) had entered Babylon, and who anoint with oil just like the *politai* who are in Seleucia, the royal city, on the Tigris and the Kings Canal (...)"² ‘
- Iron armor: "Tebētu. That month, day 15, the Hanaean troops, who did not fear the gods, who were clad in iron panoply, (...)"

Beyond cultural identity, the concept of fashion could also be taken into account. Currently, fashion is not really a subject of study in the assyriological field. The Old Assyrian and the Mari texts, however, have already shown that some names of garments, which refer to an ethnic designation may in some way attest an interest

for exoticism which was transferred in the use of specific clothing.

Thus, iconography on clay and cylinder seals scenes dated to the Hellenistic period in Babylonia show representations of people with some ethnic clothing characteristics. Obviously, there is no question here that such drawings should be regarded as an accurate reflection of the clothes actually worn by the native Babylonians or Greek-immigrants: it is well-known that in the field of glyptic, for example, the iconography depends on specific conventions of representation and that such codes are far from being representative of the reality of everyday life.

Novelties, such as the nude hero, have little chance of being considered as a true reflection of people walking in the streets of Babylon. Conversely, the far more traditional designations of clothes worn in religious contexts, including the priest's costume, do not furnish a reliable picture of the reality of everyday life in the matter of clothing.

On the other hand, in the Babylonian marriage contracts from the 4th and 3rd centuries BC, especially in the composition of dowry gifts, we find mention of clothes and fabrics that have little to do with previously known designations. Does this mean that new clothes were really used, or does such an unusual vocabulary reflect mainly the predominance of a non-Akkadian language such as Aramaic? We know that Aramaic was increasingly used in Babylonia since the end of the 6th century as the main spoken language in opposition to the written Akkadian, which progressively became a language restricted to legal and historical writing, while Sumerian was still in use for scientific, literary and religious texts.

The written sources which can be used are however not very numerous, and what follows is more of a preliminary investigation than a full study provided with exhaustive data. We will therefore determine first if it is possible to speak about clothing in a religious context, and then about clothing in secular context, in the time of the Seleucid Babylonia from the 3rd to the 1st century BC.

1. Clothing in religious context

The textile fibres attested are the same during the 3rd century BC as before: mainly wool, but also linen for luxury clothes and religious needs. If the Urukian rituals are a trustable source and are not too anachronistic, they show how the tradition was maintained, in broad terms, concerning the use of the same textiles for religious services. We must remember also that in the *Astronomical Diaries* that were written in Babylon during the 4th, 3rd and 2nd centuries BC, the price of wool was one of the main commodities which was accurately recorded every month in Babylon, together with the price of dates and barley.

1.1. Weavers and Prebendaries

We must first consider the documentation dealing with the temple's weavers, the wool rations, and the allocations to prebendaries. These aspects are documented by the Esagil's archives, collected and studied by T. Boiy,³ which mention several artisans producing fabrics and making clothes. Following to the usual Mesopotamian terminology, these are referred to as *uš-bar* (Sumerian) and *išparu* (Akkadian).

We find some *lú-uš-bar* in Babylon who receive silver.⁴ They are: *Bêl-ušuršu*/*Bêl-apla-iddin* (CT 49 128:10) and *Nabu-nadin-aḥḥê* (PSBA 19 139–140:18), who is referred to as an *išpar kite*. The text CT 49 190 even mentions a "Council

(*kiništu*) of the weavers”.

In the second largest city of Hellenistic Babylonia, Uruk/Orchoi, the priests and prebendaries of Anu's temple received regular wool-rations. In P. Corò's recent book concerning the prebends in Uruk,⁵ we find that the goldsmith's prebend (*isîq kutimmi + bit pirištûti*) includes some compensation in the form of garments and fabrics. The contracts from Uruk give provide data about goods retrieved by the prebendaries from offerings to the gods and cultic material. Together with food offerings and aromatics, they also received pieces of clothing (VS 15 37:4 and 22 túg *hu-ša-na-tu₄*)⁶ or raw wool (VS 15 37:4 and 23 túg *šu-u-[pat]-tu/ta*).⁷

1.2. Gifts offered to the temple

Garments for religious offerings may be put in the temple's offering box, called *quppu u pânât quppi* 'the box and the space in front of it'. These garments probably considered to constitute a single set for the wardrobe of the divine statues, are called, in a traditional way, *mušiptu*.

CT 49, 160 (28-i-155/219 = 92 BC)

Bêl-ab-ušur (...) spoke to Bêl-tabtan-bulliṭ (...) the *šatammu* of Esagil, to the Babylonians and the members of the Assembly of Esagil, saying: "The offerings deposited in the box and the space in front of the box of the daily offering of the temple – excepting gold and precious stone vases, excepting juniper and wine, excepting the contents of bowls for flour, libation bowls and sassu-containers, excepting donkeys, horses, and mules, excepting clothes (túg *mu-šip-tu₄*) and (*hé(?)-la-ti-i*), excepting garments of purple (túg-sîg-sag *šá da-SI*), excepting contributions from the king and the queen, (that is to say) all what is prebendary's property [...]"

1.3. Fabrics for cult statues

During the Hellenistic Period in Babylonia, the ceremony of clothing (*lubuštu*) the divine statues was still practiced regularly, every month in the temples. This topic has been treated exhaustively by S. Zawadzki, and we may just refer, as a whole, to his book concerning the God's Garments.⁸

1.4. Fabrics for cultic furniture

Clothing of cult statues is not the only context in which fabrics were produced and used within the temple. Some other elements that can be considered as cultic furniture concern fabrics for daily use.

According to the *Rituels Accadiens*,⁹ in the Esagil, but probably also in other temples, the area where the divine statue was sitting was protected by a large linen curtain, the *gadalû*, (from the sumerian *gada-lá*); thus, in the morning, the chief-priest had to 'awaken' the god by opening the curtain:¹⁰

ana igi den ku₄ túg-gada-lá ina igi den u dgašan-ia idekku

He enters before Bêl, he removes the linen (curtain) before Bêl and Bêltiya.

As part of their rations, the priests of the *bît pirištûtu* receive some of the pieces of wool or linen which were used to cover cultic material. The context is here useful because it may, sometimes, be used for clarifying the meaning of the names of some garments. For example, what is registered in the CAD as Akkadian *suppu* (with variants such as *šupattu*, *šuppātu* or *šuppîtu*) with the meaning 'a band of carded¹¹ (more probably: combed) wool' and an etymological comparison with Aramaic, must be re-considered: in the practice, it seems more likely to be a piece of woollen cloth used to cover the sedan chair of the goddess Antu and the chairs

on which the gods are sitting.¹² We may even ask whether the *šuppu* was not a kind of cushion or something similar. The same priests also receive a *huṣānu*.¹³ According to the CAD, *huṣānu* could be a leather belt or a cord, but, in such context, it could also be a woven strip or a ribbon that were occasionally wrapped around the waist. We may deduce from the same context that *ḥuṣānu* refers to a belt, as it is customary in the usual lists of clothes, but it also refers to something else: it seems to designate some kind of bands or strips, which the prebendaries can re-use, even if it is not always possible to determine in advance to what use such items will be put.

A special case is represented by the ritual of the *lilissu*¹⁴ where all the products and objects which are used for the rituals are listed, including a tūg *suhattu*¹⁵ and a *kutummu*.¹⁶

1.5. Clothing of the priests

Since the 3rd millennium BC, linen was used for the garments of the priests, and the Hellenistic era is particularly rich in data for linen. Although the rituals of the Seleucid period do include other garments in which the priests are dressed, we note that the vocabulary of the many well-known linen garments worn by the Babylonian priests of the 1st millennium remains the same as in preceding times.

In this sense, the more explicit textual documentation is provided by the ritual UVB 15, 40 edited by A. Falkenstein.¹⁷ In this ritual, we find the specification of the priest's clothing, category by category. Thus, we may distinguish between the *sibtu*-tunics with or without fringes or sleeves(?), a *lubāru-coat* worn over, and possibly a coat shaped like a chasuble(?), the *hullānu*, completing the garment.

Obverse

(...)

the *mukkalu-priest*, the [.....-priest]

6' [are covered] with a *lubāru-coat* (and) a *hullānu*-chasuble;
their head is covered with a *tapsu*-headdress;

the long-haired priests, the brewers, the bakers, the sacrificer, the millers,
the freemen (SU-bar-ra) and the servants are covered with a *sibtu*-tunic and they put
two (interlaced) *mēzeḥu*-strips over;

the consecrated lamentation-priest is covered with a linen *lubāru-coat*;
when he wears his *lubāru-coat*, it does not take part to the *lilissu-drum*;

the non-consecrated lamentation-priest is covered with a *sibtu*-tunic and he puts two
(interlaced) *mēzeḥu*-strips over the tunic;

the chief lamentation-priest is covered with a linen *lubāru-coat* and his head is
surrounded by a purple headband;
when he stands near the *lilissu-drum*, he must remove the *lubāru-coat*,
[when he.....], he is dressed in his (full ceremony[ceremonial])-garment;

[the] are covered with a *sibtu*-tunic [embroidered with stars] and a rainbow;
they put [.....] on the left.
(...broken...)

(The-priest) puts on a linen garment and a *sibtu*-tunic without a fringe, and he ties
a thin *ḥuṣānu*- strip around his body; over these (clothes of) white linen, he has a *lubāru*-
garment, he ties a *nebēḥu*-band around himself; over the *lubāru*-garment, he has a garment
[..... of] linen covered with red threads and he ties (another) *nebēḥu*-strip around:

thus he is dressed in his dress (of ceremony).

Tunics and coats are girded with belts or bands interlaced on the chest: *huṣānu*, *mēzeḥu*, *nēbeḥu* that have their own decoration and are well attested since the beginning of the Neo-Babylonian period. Finally, some priests wear a special headdress: a *tapsû*-cap for the exorcists and a purple headband for the Chief lamentation-priest.

Apparently, the main difference from the previous period, is that we find garments here worn by the priests, which were previously associated with the statues of the gods. As shown by S. Zawadzki,¹⁸ the *lubāru* which was previously a piece of clothing worn by the gods' statues, is later mentioned in the ritual text UVB 15, 40 in relation to priests. This is clearly an overgarment, heavily weighted with ornaments, and even this *lubāru* may be covered by an extra linen-garment.¹⁹

We can note, in the ritual text UVB 15, 40 the reference to some drawings of deities which were embroidered(?)²⁰ on the *hullānu*-chasubles of the priests:

(Here are) the names of seven images of the gods which are embroidered on the *hullānu* of the *ērib bīti*-priests: the two little Gemini: Ennun silimma and Maskim-silimma, then Udug-azida, Udug-Agabbu and Nin-ki-šarra (...).

Another text from Hellenistic Babylonia published by M. Jursa²¹ includes an extremely rare mention of the clothing of female religious personnel:

Letter of priests (*ērib bīti*), authorized persons and Nanaia-bulliṭiš the chief of the female singers to the scribes and to the headquarters of the Esagila's administration. We are waiting for the delivery of two linen garments and one *gammidatu*-garment for (Mrs.) Sagki-kuda.

1.6. The king's clothing, religious ceremonies

In the 'Nabonidus Chronicle', the costume which Cambyases (or Cyrus) would have worn at his coronation as king of Babylon in the spring of 538 in the E-nig-gidri-kalama temple is mentioned. The passage is however broken and subject to divergent interpretations.²² This temple was also known as the temple of Nabu-ša-Harê. It was located at the northeast of Esagil, and reputed to be the place where the coronation of the kings of Babylon took place:

All of the people bared their heads. On the fourth day when Cambyases, son of C[yrus] went to the ... Egidrikalammassummu-official of Nabu, who ... [...]. When he came, because of the Elamite dress¹, Nabu the hand of [...] ... [...]

The king's clothing is also mentioned in some rituals, either by the verb *labāšu*, or with the generic word *tillu* 'clothing'. F. Wiggerman²³ considers it to be a kind of 'uniform', that is to say a standardized dress required for the king's religious duties. In any case, an accurate description is found in the ritual text UVB 15, 40 of the clothing worn by the king 'in order to take the hand of the gods':

8 clothing of the king in which he is dressed for taking the hand of the gods:

a *naḥlaptu*-tunic of linen, a patinnu-belt, and a *lubāru*-garment embroidered with.....

10 then, another *lubāru*-garment with a collar²⁴ and belt, a braid (or: a vertical strip) made of *šihṭu*-wool, a braid (or: a vertical stripe) white,

12 a braid (or: a vertical stripe) green, plus a jewel, called 'Ištar's charm'

a Moon crescent, a cylinder-seal of jasper, a necklace and a bracelet (*samaru*) of gold.

During some ceremonies, a royal attire is also mentioned, called a *túg-síg*, literally

‘woollen garment’, in Sumerian, in the *Rituels Accadiens*, edited by F. Thureau-Dangin (Thureau-Dangin 1921). F. Thureau-Dangin reads the word as being the Akkadian *sissiktu* but understands it as a coat, not as the usual *sissiktu*-fringe of the garment.

The concrete presence of a Seleucid king during the ritual (in this case, a building ritual) is unlikely in Uruk during the Hellenistic period. Actually, the king was represented by his *sissiktu*, the royal coat, as was customary since the Neo-Assyrian period. We know that when Antiochos III visited Babylon in 188 BC, the priests of the Esagil brought to him the royal coat of Nebukadnezzar II.²⁵ But Antiochos was not only looking at the coat: it seems that he had been dressed in it, in order to participate to the New Year’s Ceremony. The coat is thus qualified as “túg-síg-sag šá¹⁴pa-níg-du-uri₃ lugal šá ina é bu-še-e”. According to Borger 2004,²⁶ síg-sag was the *argammanu* or purple. The túg-síg-sag would thus be a purple robe that was worn by the king in the rituals of the Esagil. So there remains some ambiguity or confusion in the texts of the later period concerning the designation of the royal purple coat between túg-síg/sissiktu ‘coat or fringe of the garment’ and síg-sag ‘purple’, probably with a metonymy.

1.7. *Fabrics in religious context*

We will consider here an especially interesting text from Uruk, NBCT 1244, edited by P.-A. Beaulieu.²⁷ This is one of the very few administrative texts of the Urukian Bīt Rēš during the Seleucid period. It dates from year 59 of the Seleucid era and is an inventory of fabrics, especially linen, for clothing cult statues (Anu, Nanaia).

Some fabrics are used to cover cultic furniture, such as a *šubtu*-support, a *kigallu*-stand, an *agû*-tiara, a *tallu*-sedan chair, and a *kululu*-cap. Some of these fabrics may be reused as stripes (*sūnu*). Clothing and fabrics are stored in wicker baskets (*hallatu*). The most noticeable point is the distribution between the groups of garments and fabrics. We find thus:

- Standard linen fabrics (gada-meš)
- Fabrics called ‘linen byssus’ (gada (gal) šá bu-ú-šu). The determinative ‘gada’ may indicate that the fabric was really made of linen. It would thus be an ‘extra fine’ linen. This is the interpretation of Oppenheim 1969.²⁸ But we can also follow P.-A. Beaulieu, and consider that this *bušu* is a ‘sea silk’, produced by the ‘big pearl’ (*Pinna nobilis*), a large bivalve shell from Phoenicia, and used to make luxury fabrics.
- Fabrics called ‘linen šaddinnu [gada (gal) šad-din], for which P. A. Beaulieu suggests a connection with hebrew *sadin*. It is also known in Neo-Assyrian times as a ‘gown’, that is to say a cloth draped around the body, and not sewn.
- Fabrics called *ka-parassu* [ka-pa-ar-as-(su)], translated by P. A. Beaulieu as ‘cotton muslin’.

All of these fabrics are recorded and stored together under the designation ‘large and small linen fabrics’: there were 115 in use (Il. 1–9), and 91 stored in a wicker basket (Il. 10–13).

This demonstrates that during the reign of Antiochos I in Uruk, the temples had at their disposal different sets of very precious fabrics, imported in Babylonia for cultic purpose, like linen, fine linen, and cotton. With the exception of linen, none of them appears in fact to be a native product of Mesopotamia, and even the linen for religious usage seems to come mostly from Egypt during the 1st millennium.

Could the use of such rare fabrics be a consequence of Alexander’s conquest? That would not seem likely. The establishment of the Seleucid Empire perpetuates the links, between Near and Middle East (including eastern Iran and modern

Afghanistan) with the creation of a unified area of political power and of trade. But this was already the case under the Achaemenids. Thus, we are led to suggest the possible import of such luxury products during the 4th, even the 5th century BC in lower Mesopotamia. These were part of the internal trade of the Achaemenid empire: linen coming from Egypt, cotton from India, and the byssus from the Levantine coast.

2. Garments in a private context during the Hellenistic period

Unfortunately, the results for this category are more heterogeneous. We find very general and traditional designations, such as *tûg-kur-ra*, *muṣiptu*, or *gada*. And we find confirmation that Babylonia remains a major centre of production of woollen and linen fabrics and garments. For example, a text specifies: “the satrap of Akkad has sent silver, fabrics, goods, and tools (...) to the king.”²⁹

But our information comes mainly from dowry inventories (5 documents in total). There, we find records of garments which fall into two categories: those with identified words; and others with unknown or poorly-known words. They are presented here in alphabetical order.

2.1. First category³⁰

* *gammidatu*

A word that had been used for years in later Mesopotamia, since the Neo-Assyrian period; its form and specific use (an over-garment?) remain to be determined and it is recorded by dictionaries as a word of ‘Aramaic origin’.

* *gulēnu*

The same is true for the second word, (from Aramean *gelaimā* or *gelīma*), also attested during the Neo-Assyrian period. This textile is usually made of wool; according to the text Moore 1939 n°47:1, its manufacture requires a relatively long time (the planned rate of production is one *gulēnu* per year).

* *gunakku*:

This is a heavy coat made of wool that Aristophanes assigns to the Persian world.³¹ It was clearly a garment of great value with a specific decoration made of woollen curls. According to the CAD³² *gunakku* is connected to the Aramaic *gonakkā* and Greek *kaunakes*. From the context, it appears to be mostly a women’s garment.³³

* *kitinnû* (with fem. *kitinnîtu*)

The present discussion follows the definition in the CAD where *kitinnû* is considered to be a derivative of *kitû* ‘1. linen (as material) 2. a linen towel (?)’. In the text Roth 1989 n°38:8, we find the term (síg) *kit-ni-tu*₄ which may be a variant of *kitinnîtu*. Thus, this would not be a simple fabric made of linen but a woollen garment (because of the sumerian determinative síg) already tailored. This garment is considered as *ḫišiḫtu* ‘valuable’. It is associated in the same text to a síg *tu-x x* and both together are valued at 25 shekels of silver, making them a costly clothing.

kitû

Written *gada*-(há), is both the material (flax), the woven (fabric) and a ‘linen cloth’. It is mentioned as such in the text presented in the previous workshop by S. Zawadzki.³⁴

muṣiptu

Muṣiptu is the most frequently used word to describe, as a whole, a set of varied clothing (wardrobe), or a 'suit', that is to say several pieces (underwear/inner robe/belt/outer garment/headaddress), or a single everyday garment. To such a set is assigned the word *rakistu* 'attached' in the same text published by S. Zawadzki. *Muṣiptu* appears also there with the epithet *ša šumundu*, understood as a dissimilated form of *ša šumuttu* 'with a beet(root) colour'. In the marriage contract Roth 1989 no. 38: 10, *muṣiptu* is pre-qualified with *sig* (wool). It is registered with another garment made of wool, and together they have a value of 10 shekels of silver. *Muṣiptu* is also mentioned in Roth 1989 no. 40:10, where the suit is called *muṣiptu rabītu* ('long?') or *qallatu* ('short?') and has a value of 3 mana of silver. We find the same in Roth 1989 no. 42:18, where 13 clothes are summarized as *muṣiptu₄ a₄ 13-ta gal-tu₄ ù qal-la-tu₄*. In this text, the set consists of both wool- and linen-clothes.

naṣbatu

This is mentioned in the marriage contract Roth 1989 no. 38:11 and is known to have the meaning of 'outer-garment', with a value, there, of 4 shekels.

qirmu

This textile also appears in the marriage contract (Roth 1989 no. 42:13); it is a not very frequent term, but is attested from the Neo-Assyrian times where it was also part of a set of clothes given in a marriage contract.

šipirtu

The contract Roth 1989 no. 38:13 associates a *šipirtu* made of linen with a bed (*gišnā*) *ia-a-nu-mi-i'-tu₄*. It is probably to be related to the *šipirtu* A of the CAD,³⁵ already associated with a canopy and a chair during the Neo-Assyrian period. It seems to be the designation of a kind of tapestry fabric, rather than a garment.

túg-kur-ra

Has the same general meaning as *muṣiptu* and is a 'garment' in the sense of a complete suit of clothes. It is found in the text Roth 1989 no. 42:11. Interestingly, in the text Zawadzki 2010, 415, BM 76136: 1, it is qualified as *eššu* (new) and *iš-hi-eš-šu* (= ?).

túg-LAM-LAM

This is a rather a problematic formulation.³⁶ Its Akkadian equivalent remains unidentified but is certainly feminine. Maybe, it should be connected with the *túg-lum-lum*, to be read *túg-guz-guz* (Akkadian *guzguzu*), which is a luxurious garment.³⁷

(*túg*) *šir'am*

It is mentioned in the marriage contract M. Roth 1989, no. 42:12 and is an Aramaic term well documented throughout cuneiform literature during the 1st millennium. It is an outer garment, made of wool or leather that may be worn for going outside and for travelling. It is thus worn also by shepherds and soldiers.

The permanent presence in such lists of clothes of very traditional designations, such as *muṣiptu* or *túg-kur-ra*, that apply to all kind of garments, should be noted. The various kinds of clothes made of linen are subject to specific classification with the entry *gada*, which reflects the special status of this fibre in Mesopotamia.

The terms used for some specific garments fall mainly in the category of the clothes that are worn for going outside and for participating in ceremonies or festivals. The *gammidatu*, *gulênu*, *gunakku*, *qirmu*, *sari'am* / *šir'am* and *guzguzu* probably belong to this category. All of them are, generally speaking, valuable clothes. In particular, the strong presence of non-Akkadian names should be noted here.

At least two conclusions can be drawn from these data: first, the fact that linen occupies a small but significant share in the textile part of the dowry, indicating an expansion inside the civil society of a type of fabric that had been reserved during the Neo-babylonian Period for religious purposes or for luxury garments of the higher echelons of society. In fact, the question arises whether this development is contemporary with the one found in Greece, where the linen *chiton* gradually replaces that of wool.

The second conclusion is that words which are non-Akkadian but mostly Aramaic, are used for the designation of the most valuable clothes, whereas everyday garments continue to be identified by the same traditional Akkadian vocabulary. But no Greek word appears to be clearly attested, indicating that Greek garments were probably not used in a truly Babylonian context. The west Semitic or Persian (if *gunakku* is really a word of Iranian origin, as was supposed by Aristophanes) influences appear to have been more marked. But the existing documentation is mostly for women's clothing: men's wardrobe may have been more mixed.

2.2. Second category

amur(a)sakku

Zawadzki 2010, 415, BM 76136:6' made of linen; also in the marriage contract Roth 1989 n°42.

túgbar- <si>? sag-du

Roth 1989 no. 42:12.

gadittu

Zawadzki 2010, 415, BM 76136:4': see *ibid.* 418.

kabtu? šá ši-in?-x-

unknown.

(túg)mah da-pa- <sa>-at

Roth 1989 no. 42:12. The word *túg-mah* has several Akkadian equivalences. It can be read *tunšu*, *šuturu* or *gadamahhu*. It may also designate a coat as well as a blanket (if it comes from *dapastu*).

šamtu (variant for *šamtu*) *parittanu*

a colored³⁸ *šamtu*. The designation *šamtu* applies to wool.³⁹

(gada) ša muḥḥi sag

Roth 1989s no. 42:11 is a linen veil for covering the head. See the following *ša-rešētu*.

ša-rešētu

Zawadzki 2010, 415, BM 76136:5, maybe a veil to put on the head, if not something like a pillow.

We must therefore establish a distinction between what may arise from an uncertainty in the readings (especially in the poorly preserved texts), what is likely to be understood after the emergence of parallels, and what is truly exceptional, such as the linen *amursakku*. We note that many of these terms like *paršigu* (*ša*) *qaqqadi*, *kitû ša muḥḫi qaqqadi*, or *ša-rešêtu eššêtu*, are related with some cloth put on the head designating a feminine turban made of wool or linen. Once again, no term seems to be related to Greek terminology.

The sample size remains small, since it is reduced to the dowry wardrobe, and seems, till now, especially to indicate a continuity of the oriental terminology. It gives the name of some clothes which are not marked by the presence of Greek and which remain attached to a kind of Middle-Eastern *koine* of the vocabulary of garments. Beyond the notion of fashion, we must take into account here the need to adapt the clothes to the climate of lower Mesopotamia. From this point of view, Greek wardrobe was not necessarily the most practical.

In conclusion, clothing in Mesopotamia does not seem to have become a vehicle of Hellenization: what was within the religious domain continued to be part of a well-established tradition, even when incorporating the possibility of the use of new fibres such as cotton. With regard to the wardrobe of the individual, in practice, the preserved documentation concerns above all the female part of the population. In terms of the cuneiform texts of the Seleuco-Parthian period, clothes belong to the field of cultural identity. Identity remains independent of foreign influences, after the implementation of a vocabulary common to the whole of the Near East, and maybe the use of common forms of garments.

Abbreviations

- BM Tablets in the Collection of the British Museum, London.
- BRM Babylonian Records in the Library of J. Pierpont Morgan, Yale University.
- CAD The Assyrian Dictionary of the Oriental Institute of the University of Chicago.
- CT Cuneiform Texts from Babylonian Tablets in the British Museum, London.
- NCBT Tablets in the Newell Collection of Babylonian Tablets, Yale University.
- OECT Oxford Edition of Cuneiform Texts, Oxford.
- PSBA Proceedings of the Society of Biblical Archaeology, London.
- TCS Texts from Cuneiform Sources.
- UVB Uruk Vorläufige Berichte über die in Uruk-Warka unternommenen Ausgrabungen, Berlin.
- VS Vorderasiatische Schriftdenkmäler der Königlichen Museen zu Berlin.

Bibliography

- Beaulieu, P. A. (1989) Textes administratifs inédits d'époque hellénistique provenant des archives du Bīt Rēš. *Revue d'Assyriologie* 83, 53–80.
- Boiy, T. (2004) *Late Achaemenid and Hellenistic Babylon*. Leuven.
- Borger, R. (2004) *Mesopotamisches Zeichenlexikon*. Alter Orient und Altes Testament 305. Münster.
- Corò, P. (2006) *Prebende templari ad Uruk in età seleucide*. History of Ancient Near East Monographs VII. Padova.
- Del Monte, G. (1997) *Testi dalla Babilonia Ellenistica. Volume I: Testi Cronografici*. Pisa-Rome, Istituti Editoriali e Poligrafici Internazionali Studi Ellenistici 9.
- Falkenstein, A. (1956–57) Zwei Rituale aus seleukidischer Zeit. *UVB* 15, 36–44.
- Grayson, A. K. (1975) *Assyrian and Babylonian Chronicles*. TCS 5. J. J. New York (repr. 2000).
- Jursa, M. (2002) Florilegium babylonicum: Neue Texte aus hellenistischer und spätachämenidischer Zeit. In C. Wunsch (ed.), *Mining the Archives. Festschrift for Christopher Walker on the Occasion of his 60th Birthday*. Babylonische Archive, Band 1, 107–130. Dresden.
- Linssen, M. J. H. (2004) *The Cults of Uruk and Babylon: the Temple Ritual Texts as Evidence for*

- Hellenistic Cult Practices*. Leiden.
- Moore, E. W. (1939) *Neo-Babylonian Documents in the University of Michigan Collection*, Ann Arbor.
- Oppenheim, A. L. (1969) Essay on Overland Trade in the First Millennium BC. *Journal of Cuneiform Studies* 21, 236–254.
- Payne, E. E. (2013) Two Tablets from the Yale Babylonian Collection Mentioning the guzguzu-garment. *Nouvelles Assyriologiques Brèves et Utilitaires* 2013/15.
- Quillien, L. (2013) Tûg-LUM-LUM = tûg-guz-guz; aA New Interpretation of the ‘guzguzu’ Garment in First Millennium BC Mesopotamia. *Nouvelles Assyriologiques Brèves et Utilitaires* 2013/14.
- Roth, M. T. (1989) *Babylonian Marriage Agreements 7th–3rd Centuries BC*. Alter Orient und Altes Testament, 222. Atlanta.
- Smith, S. (1924) *Babylonian Historical Texts Relating to the Capture and Downfall of Babylon*. London.
- Thureau-Dangin, F. (1921) *Rituels Accadiens*. Paris.
- Wiggerman, F. A. M. (1992) *Mesopotamian Protective Spirits: The Ritual Texts*. Groningen.
- Zawadzki S. (2006) *Garments of the Gods. Studies on the Textile Industry and the Pantheon of Sippar according to the Texts from the Ebabbar Archive*. Orbis Biblicus et Orientalis 218. Fribourg.
- Zawadzki S. (2010) Garments in Non-Cultic Context (Neo-Babylonian Period). In C. Michel and M.-L. Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, 409–429. Ancient Textiles Series 8. Oxford.

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2 BCHP 14:1–4 (http://www.livius.org/cg-cm/chronicles/bchp-greeks/greeks_01.html).

3 Boiy 2004.

4 Boiy 2004, 247.

5 Coro 2006, 333–359.

6 According to the *Concise Dictionary of Akkadian*, 122b *Hušānu* is a ‘sash or a belt worn around hips’.

7 Taken as a variant for *šuppu*, which would indicate that it is a raw material, and not a part of the gods’ wardrobe.

8 For the Seleucid period, see also Linssen 2004, about Seleucid rituals, 51 § II.3.3, which studied the monthly and annual lubuštu-ceremonies.

9 Thureau-Dangin 1921.

10 See also Linssen 2004, 80.

11 CAD Š, 249b (sic). But as carding is not attested in ancient Mesopotamia, it is most probably combed wool. See *Concise Dictionary of Akkadian*, 341a *šuppatu* II.

12 See OECT 9, 40: *šuppētu ša šisṭallu ša Antu* and OECT 9, 45: *šu]-up-pa-a-tú šá šisṭu-za-meš*.

13 For example, VS 15, 37:4 and 22 tûg *hu-sa-na-tu*. Cf. the previous page and note 6.

14 Linssen 2004, 255.

15 Col. iv: 28: maybe a headdress?

16 A carpet?

17 Falkenstein 1956–57, 40 and pl. 34. See Zawadzki 2006, 91.

18 Zawadzki 2006, 87–91.

19 See also BRM 4 6 // BM 134701 (Linssen 2004, 307–312), ll. 21’: *a-di an-ge₆ ú-nam-mar un-meš kur šu-bar sag-du-šú-nu šá-aḫ-ṭu ina lu-bar-ra-šú-nu sag-du-su-nu kat-mu* “until the Moon had completed the eclipse, people must have removed their headdresses and have their heads covered with their lubāru-garments”. And in the same text, ll. 43’-44 *lú gala-meš tûg gada mu₄-mu₄, ina lu-bar-šú-nu nu-uk-<ku>-su-tu sag-du-su-šú-nu kát-mu* “the lamentation-priests are clothed (*labšû*) with a linen garment; their heads are covered with their *lubāru-coat* in rags”.

20 See CAD Š₁, 490a *šapu* B.

21 Jursa 2002, 108.

22 Grayson 1975, 104–111, Nabonidus Chronicle, col. III: 24–27.

23 Wiggerman 1992, 53–54.

24 The *gû* (= Akkadian *kišādu*) is a ‘string’, or an abbreviation for *gû-(è-a)* (= Akkadian *naḫlaptu*), if we consider this as a second set of clothing. The first option seems more likely, given the use of the same term which is clearly identifying a collar.

25 Del Monte 1997, 66–68.

26 Borger 2004, 429 no. 816.

- 27 Beaulieu 1989, 69–74.
- 28 Oppenheim 1969, 248: “The finest linen imported is called *bušu*, byssus, and this terminology was also used in Mesopotamia and in Syria”.
- 29 Smith 1924 Pl 6:11: *lú muma’ir Akkad kaspu tág-mušiptu būšu u unātu (...)* ana šarri ušēbil.
- 30 * = not originally a Babylonian name.
- 31 *Sphekes* 1123–1172.
- 32 CAD G 134a.
- 33 See BRM II 50: 8–10 and the marriage contract Roth no. 42:13.
- 34 Zawadzki 2010, 415, BM 76136:2.
- 35 CAD S, 201b ‘a sash woven or treated in a special technique’.
- 36 See Zawadzki 2010, 415, BM 76136:5’ and 419.
- 37 See Quillien 2013 and Payne 2013.
- 38 See CAD *barittannu*: a colour used to describe horses, with an indo-european etymology.
- 39 CAD Š1 339a: in TuM 2/3 2:28 the word is written *šamtu*.